FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

Founded in 1909 by Stanley Spooner

FIRST AERONAUTICAL WEEKLY IN THE WORLD

DEVOTED TO THE INTERESTS, PRACTICE AND PROGRESS OF AVIATION

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

No. 1344. Vol. XXVI. 26th Year | SEPTEMBER 27, 1934 | Thursdays, Price 6d. By Post, 7½d.

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1.
Telegrams: Truditur Watloo, London. Telephone: Hop 3333 (50 lines).

HERTFORD ST. COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress Birmingham. Telephone: Midland 2971.

60, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.

26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0; 6 months, 16s. 6d.; 3 months, 8s. 3d. Other Countries: Year, £1 15 0; 6 months, 17s. 6d.; 3 months, 8s. 9d.

Monopoly

MUCH food for thought may be found in the article which we publish on another page entitled "The Dangers of Monopoly." We have always been alive to the bad results which would follow if any one party (in this case it is Railway Air Services which has to be considered) obtained a monopoly of inland air transport and then allowed the infant to languish and possibly die of malnutrition. On the other hand, we think it probable that inland air transport will not reach full maturity and adult strength unless its parent has ample resources and is endowed with wisdom and experience in the control of traffic. The best results, it seems to us, are likely to be obtained by a combination of those assets with enthusiasm for aeronautics. The difficulty seems to be that some of those who have the enthusiasm have not got the resources and the traffic experience, while the writer of the article in question doubts, or rather more than doubts, whether the railways are capable of the necessary enthusiasm.

The writer of the article truly says "capital requires a return, and the return is an end in itself." We are content to accept that as a basis for further examination of the question. Things were different in the early days when "Roe the Hopper" was experimenting with his triplane, and when Mr. Spooner (defying the advice of his best friends) founded *Flight*. Then what was needed was an enthusiasm which cared not for thoughts of dividends. Now we do not wish to think of air transport as an enterprise which calls for altruism; we prefer to regard it as a commercial proposition. It may still need some official support, but the giving of that support has always been defended on the grounds that in due time air transport would pay its way, and more. There are certain cases where the return will be indirect; but so long as there is a return which is worth while, then the assistance of the State has been justified.

Our hope is that where the railways can see a prospect of dividends from the use of the air they will set the aeroplane to work. We should never expect them to use it on unproductive routes out of mere enthusiasm for flying, nor do we want to see such a policy followed. We do not want to see air transport treated as a spoilt child. Our contributor says that railways have a "dead hand," meaning no doubt that, so long as their general operations show a good profit, they will not bestir themselves to make the most out of their minor operations—and inside the British Isles air transport can hardly expect ever to be other than a minor concern as compared with rail transport. If he is correct in this, it means that the railways have learnt no lesson from the shock which road transport gave them. That they have, indeed, learnt a lesson is shown by their coming into air transport "on the ground floor." The question now is whether they will merely use their position to stave off inconvenient competition from other air companies without making much effort themselves to get the best possible out of the air. That would be the working of the "dead hand." We prefer to hope that the railways will see profits in certain air lines, and will accordingly do their best to earn the additional dividends. The railways cannot be blind to the fact that an air-minded public is now growing up, and that before long there will be a public demand for air transport over certain routes inside the British Isles. To satisfy the travelling public within reason is undoubtedly part of a wise railway policy.

Silent Aeroplanes—A Relief and a Menace

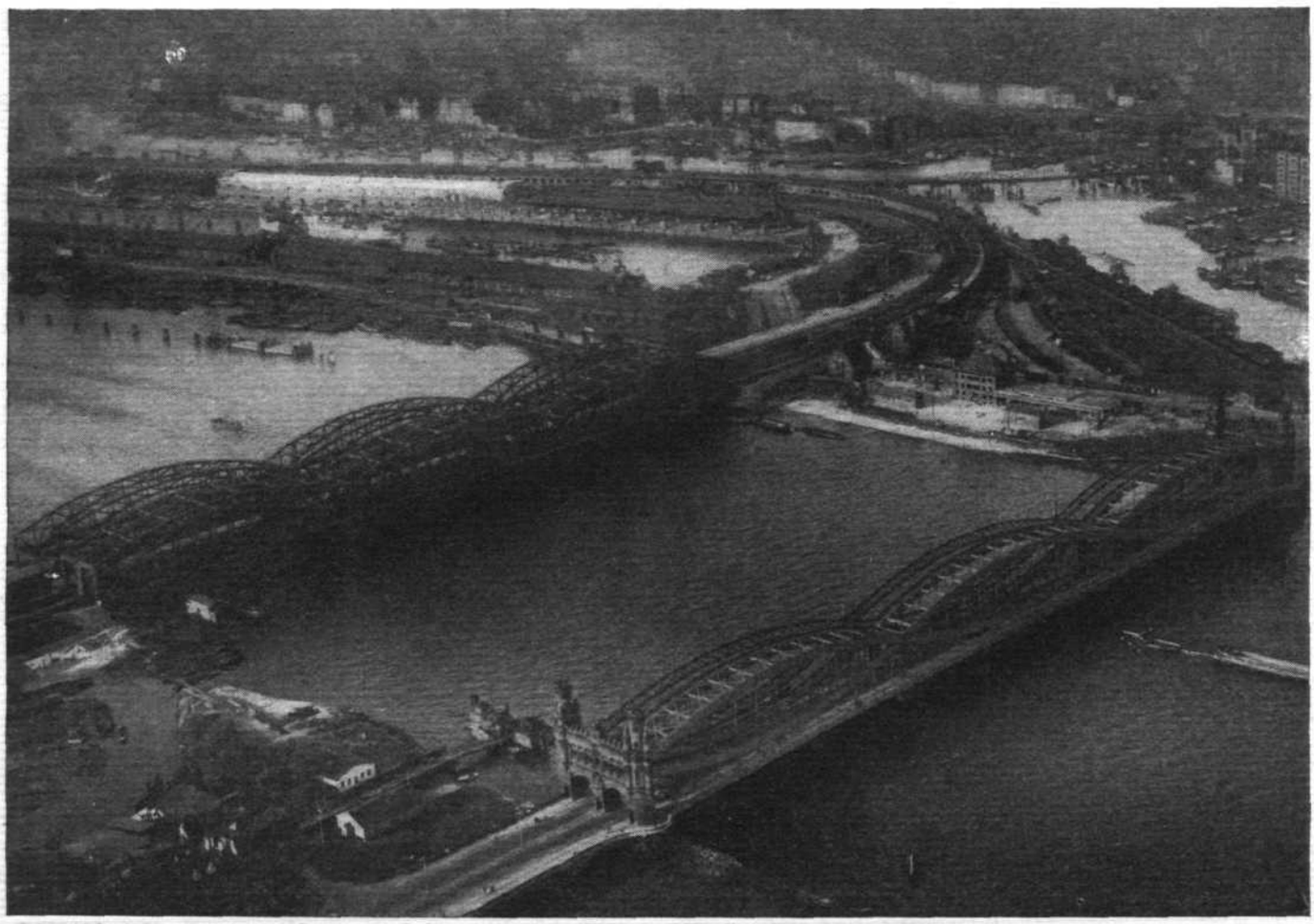
ALL who are interested in civil flying will rejoice at the prospect of much less noisy aeroplanes which seems to be promised by the new silencer described on another page. Passengers in the most modern types of commercial aircraft have already found their lot much improved by such devices as padding the walls of the cabin, and are already able to talk to each other without straining the voice. Pilots have not shared in those advantages, and people who live

near an aerodrome or on a route followed by a particular air line regularly fill the correspondence columns of newspapers with their complaints about the noise of the machines. Part of this noise is due to the propeller, and for this no remedy has yet been found; but the engine exhaust is the chief offender, and the new silencer seems to have a very marked effect in reducing exhaust noise without appreciably lessening the efficiency of the engine. That is all very much to the good.

From the point of view of war, however, we can only regard an efficient silencer as a disaster. If we follow Sir John Simon in his attempts to divide instruments of war into offensive and defensive classes, an efficient engine silencer must be ranked as one of the most offensive instruments conceivable. It will tremendously increase the power of the bomber by making its detection (and therefore its interception) very much more difficult. Our defence scheme is based in the first instance on sound. When they have a choice, both day bombers and night bombers select cloudy days and nights for a raid. Even by day it would be a rare event for our Observer Corps to get their first intimation of a raid by catching sight of the raiders. By night it would be almost impossible for them to see the enemy. They rely on their ears, and it is they who give the first news of a raid to Fighting Area headquarters. Then the Territorials come into play, and they rely mainly on their sound-locators. The latest patterns of these instruments are very good, and even clouds do not always protect the bomber from the attentions of the defence when the sound-locators are keeping track of the enemy's path. They enable the searchlights to point out the course of the raider on the clouds above which he is flying, and then, of course, the patrolling fighters fly up to investigate—and a night bomber intercepted may be reckoned a night bomber destroyed.

Silence the aeroplane, and you have at one stroke cut the ground from below the feet of the defence. If the Observers and the Territorials cannot hear the raiders, the defence seems to be well-nigh impotent. Clouds will give the raider an immunity by night which he has never known before. By day the eye of the defence is not so entirely subordinate to the ear, but again the silent aeroplane weights the dice heavily on the side of the aggressor.

What is true of bombers attacking Great Britain is also true of British bombers carrying out a counter-offensive against a Continental enemy. The prevailing school of thought in the Command, Air Defence of Great Britain, has more confidence in the counter-offensive, we are told, than in the actual defence by the Fighting Area and its ground troops. If that school of thought is correct, then it follows that Great Britain stands to gain more than she will lose by silencing the bomber. That theory was once held almost universally, and it must be admitted that the speed of modern day bombers is so little below that of the fighters, while the fire power of the bomber formation is so formidable, that by day the defence is set a difficult task. In France, we read, opinion is beginning to swing the other way, and to place more reliance in a strong defence. Anyway, in 1918 it was Gen. Ashmore's defence which brought final immunity to London, not the bombing activities of Sir John Salmond and Sir Hugh Trenchard. We must hope that the matter will never be put to the test of war.



HAMBURG: An aerial view of the impressive Elbe Bridges spanning the River Elbe at Hamburg. Note the various canals, called fleet locally, of which there are many.

The Outlook

A Running Commentary on Air Topics

Technicalities of the Melbourne Race

WE take great pride in our name for being the technical authority on aviation matters. We would like to give full details on every occasion as soon as they are available, but often our hands are tied, sometimes by authorities, sometimes by manufacturers. This week we are certainly glad to be able to give our readers some information which they will appreciate in our large table which contains the first published list of the technical details of the machines in the England-Australia Race. With these details before them the "slide-rule merchants" will be able to work out the speeds for the machines in the handicap race.

Air Survey Enlivenment

THE appointment of Col. M. N. MacLeod to the post of Director-General of Ordnance Survey has particular significance at the present time, as this officer has had a wide experience of aeroplane photographic survey, and should, therefore, have no doubt about the advantages of the proposals of H. Hemming & Partners for revision of the 1/2,500 scale Ordnance Survey Plans which were described the week before last. Air survey seems at last to be becoming recognised as one of the most valuable ways of using aeroplanes for the help of all industries. Whether it is the provision of plans for town development, laying out of factories or irrigation works, prospecting of uncharted land for geological or forestry interests, or anything else, the result undoubtedly benefits an enormous number of people on the ground in a shorter time than by any other method.

Speed and Comfort

THERE was a time when it was generally held that speed and comfort were incompatible, and that no aircraft could be expected to combine both. Recent developments seem effectively to have disposed of that idea. In this country we are gradually developing types which are both speedy and comfortable, and if we may be said to be lagging a little behind it is in the commercial aeroplane class. Safety first, comfort second, and speed third has been the British motto, and few will deny that Imperial Airways, Ltd., have, by living up to that motto, established an enviable reputation for safety and reliability. When, however, one sees what other nations are doing in the way of fast air transport, it is very natural to ask that Great Britain should not let herself be out-distanced too far. It is true that the modern fast passenger aeroplanes have not been in service in any country sufficiently long to provide experience comparable with that which we have with some of our machines, and until they have been operated on regular air routes for a year or two it is impossible to decide how suitable they are. The fact remains, however, that these fast machines are being built and taken into use abroad, and if they come up to expectations in actual service the competition which they threaten cannot safely be ignored.

We not infrequently receive letters of complaint from readers who have returned from India by K.L.M. machines. Their complaints are not of the Dutch route. On the contrary, they are usually full of praise for that organisation. But they bemoan the fact that the time taken by Imperial Airways is so long compared with that of the K.L.M. that, much as they would prefer to travel by the British line, the saving in time offered by the competitor is such that it cannot be disregarded. We do not say that this complaint is as yet general. But when the new Fokkers are put on the Amsterdam-Batavia route they will further speed-up the journey, and then the idea that the British line is too slow may well spread rapidly. Comfortable the new machines certainly are, and the F.36 is about 50 per cent. faster than most of our large commercial aeroplanes. The Douglas is even faster, its cruising speed being close on double that of most British machines, and it is at least as quiet as our best. Developments in the immediate future will bear watching.

A Misnamed Gyro

NOW that the Directional Gyro is so often seen on the instrument boards of discerning pilots, it is well to draw attention to a common error. This instrument is not a gyro compass, although it is often referred to as such. A gyro compass is being perfected for use in aircraft, but is not yet in general use. A Directional Gyro is an instrument which has to be set by a compass, and then it shows immediately any deviation from that course. It is particularly useful for showing the amount of alteration of course during a turn, as it is not subject to errors like Northerly Turning error which tend to make the magnetic compass sluggish, so that it takes an appreciable time to settle down after a turn.

International Cameraderie

IT is a growing and commendable practice in European countries to arrange parties, entertaining pilots and passengers of light aeroplanes. It is to be hoped that this idea will be extended even more. It spreads a spirit of fellowship among pilots and may well be the seed from which will grow a widespread international feeling. If so —and there is no reason why it should not be so—air pilots will justly be able to claim that they work more for peace than for war. Flying effectively shortens the distances of the world and brings closer together people and nations. It can, therefore, be used as an agent for the avoidance of troubles and misunderstandings by making personal contact possible for people of even the most widely separated nations.

Single or Twin?

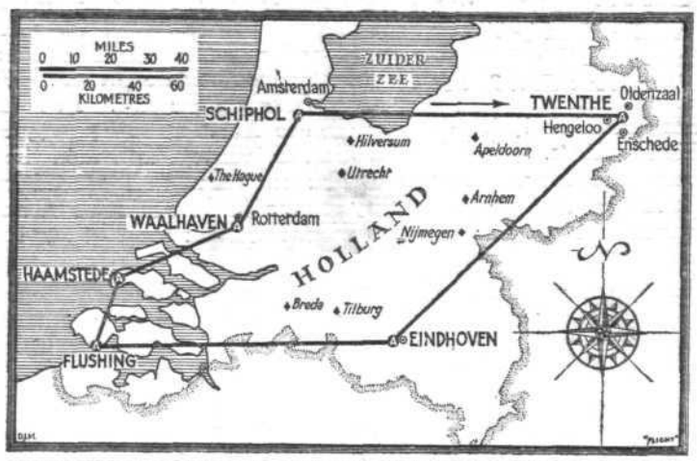
A *SPLIT-PIN* seems to have been the cause of failure of the first scheduled non-stop refuelling-in-the-air flight. How much may hang on so little! However, Sir Alan Cobham, by a great deal of good judgment and a fair amount of luck, saved himself and Sqr. Ldr. Helmore a ducking in the Mediterranean, so both live to try again. We hope that they will do so, because it yet remains to be proved that regular contact can be made with a tanker-aircraft in the manner proposed, although there does not seem to have been any hitch in this respect at Malta. The mishap does raise the question whether the use of single-engined aeroplanes for this class of work is justified. Sir Alan's argument is that with only one engine there is less to go wrong, and that by using an old, well-tried and reliable type of engine he made his trip as safe as possible. The fact remains that had he had a twin-engined machine which, even if it could not maintain height indefinitely on one engine with a full load, could prolong the losing-height period almost indefinitely, he would have been able to turn and land where he wanted and so have avoided any damage at all.

SPEED AND COMFORT

Some Impressions of an Afternoon Spent in Flying Around Holland in an F.36 and a Douglas D.2

By C. M. POULSEN

SCHIPHOL, the Amsterdam aerodrome, presented an even busier appearance than usual last Saturday. The day was something of an occasion, not only for Amsterdam, but for the whole of Holland. The N.V. Nederlandsche Vliegtuigenfabriek, better and more conveniently known as the Fokker company, was "having a party." In conjunction with the Royal Dutch Air Lines (KLM) the company had invited a number of guests to see and try for themselves two new commercial aeroplanes shortly to be placed on the KLM routes: The Fokker F.36 and the Douglas D.2. Fortunate enough to be one of those invited, I arrived at Schiphol shortly after ten. The large F.36 was just about to take off, and although this new machine made its first test flights some time ago, and has been doing a good deal of flying, this was my first opportunity of seeing it. Its take-off was certainly good, and the climb appeared to be in keeping with modern requirements. While waiting for the machine to return, one had an opportunity to examine the Douglas D.2, which had arrived from America a few days earlier. It may be recollected that the Fokker company has secured the sole rights for Europe (Soviet Russia excepted) for this design, and that the first machine to arrive from America is flying in the England-Australia race. It is the property of, and has been entered by, the KLM.



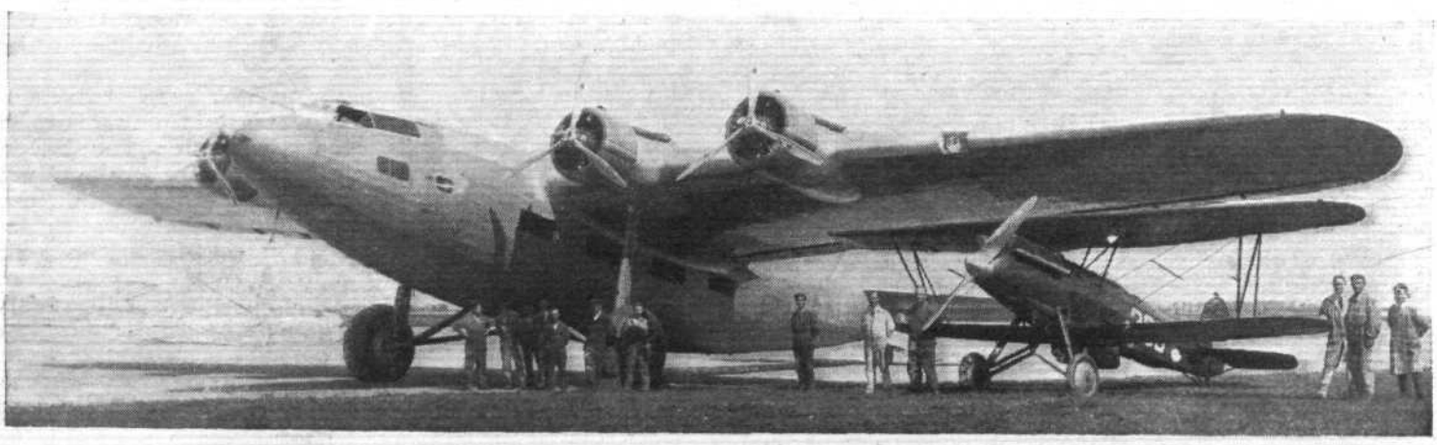
AROUND HOLLAND IN AN AFTERNOON: Sketch map of the route flown by the Fokker F.36 and Douglas D.2.

The Douglas DC 1 was described and illustrated in *Flight* of March 1, 1934. In almost every respect the D.2 is similar. It is a twin-engined all-metal low-wing cantilever monoplane of very refined aerodynamic design. Streamlining has been carried to its logical conclusion, and it is almost unnecessary to state that the undercarriage retracts. The twin-engined arrangement lends itself so obviously to retracting the wheels into the engine nacelles. Metal covering is used, the "skin" of wing and fuselage being of the smooth type. The fact that no paintwork is used externally gives the machine a rather "tinny" appearance, but the lines are very pleasing, and the workmanship looks good

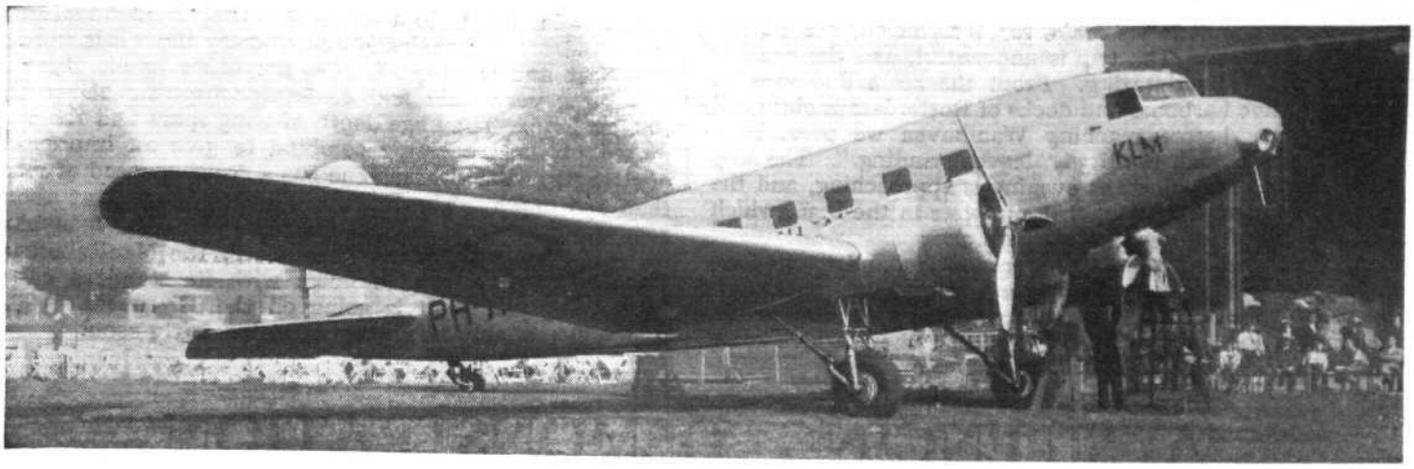
Two Wright "Cyclone" engines are fitted, and drive Hamilton Standard three - bladed controllable pitch propellers. The engines are enclosed in N.A.C.A. cowling rings, and the nacelles are carefully faired into the wing surfaces. Each of the Goodrich Silvertown wheels is carried on a fork and retracts by being swung forward and upward. Bendix "Pneudraulic Shock Struts" and wheel brakes are fitted.

This rather cursory examination completed, and the Fokker F.36 having landed in the meantime, the real business of the day began. At the very outset the thoroughness of the organisation became evident. Each guest was handed an envelope containing strip maps of the routes to be flown, plans of the seating accommodation of the two machines, a typewritten sheet with the numbers of the seats he was to occupy during the day, and a smaller envelope containing cotton wool and a packet of chewing gum. The general plan for the day was that the two machines should make a circuit of Holland, or at least of part of Holland, should alight at a number of aerodromes where the passengers transferred from one machine to the other, or from one seat to another in the same machine. In this way each passenger would have an opportunity to try both machines, and various seats in each machine. It would be difficult to imagine a better way of getting to know the qualities of the F.36 and Douglas in the shortest possible time.

The first flight was from Schiphol (pronounced Skiphall) to Twente, a distance of 90 miles. For this flight I happened to be "drawn" for the F.36, and took my seat with my back to the rear spar. Seating accommodation is provided for 32 passengers, the seats being arranged two abreast on each side, with a gangway down the centre, and alternate seats facing forward and backward. The seats are so arranged that they form lower berths for night flying, while the back rests pull out to form upper berths. The upholstery is in red leather, while the cabin walls are covered with blue leather. The seats are comfortable, although I found them a shade



SOLIDITY: The great wing depth of the Fokker F.36 inspires confidence. It has seating accommodation for 32 passengers. The Fokker single-seater fighter gives a good idea of the size of the F.36.



SPEED : The Douglas D.2 has a top speed of over 200 m.p.h., and cruises at about 190 m.p.h., while carrying 14 passengers.

high, but as most Dutchmen are tall, the seats are probably right for the majority of passengers.

Several "stowaways" appeared, but their weight did not seem to have any effect on the take-off, which was accomplished, as near as my very rough timing permitted me to judge, in about 18 seconds. Our pilots inspired confidence: Sillevis, who that very day completed 12½ years with the KLM, and Meinecke, Fokker's test pilot. Surely we could not have been in better hands. Our wheels left the ground at 11.45 (I am referring to British Summer Time, as it did not seem worth while to alter my watch), and soon we were heading East, in the direction of Twente. It was a lovely morning with bright sunshine, but a slight haze was over everything, although visibility was quite good. Ten minutes after the start we were crossing a corner of the Zuider Zee, and the play of light and shadows on the water made a pretty sight.

Ventilation in the cabin of the F.36 is good. The air is fresh and there is little or no draught. The large windows admit a certain amount of noise, but the machine is very quiet considering that it is driven by four Wright "Cyclone" engines of some 700 h.p. each. The cabin walls are lagged with a sound-absorbing material, which seems very effective. On crossing the coast line once more and entering Gelderland, sand dunes are seen below, and the air becomes rather "bumpy." The machine is, however, remarkably steady, and careful watching of the ailerons shows that the pilot does not attempt to correct slight rolls, but leaves it to the machine to level itself. The result is smooth riding except for the bumps. Some of the passengers are beginning to take on that look of studied unconcern which is usually an indication that the paper bags may be wanted, but the steward comes along with drinks, and these help for a while. After crossing the Ijssel River near Deventer the bumps get worse for a while, but then seem to abate. Twente is reached shortly after 12.20, and at 12.28 a perfect landing is made on Twente aerodrome, the 90 miles having taken 43 minutes. This corresponds to 125 m.p.h. We have been flying well throttled down for comfort.

Twente

Twente is a municipal aerodrome near the German border, and is an example of co-operation which might with advantage be adopted in this country. It is situated in the centre of the Dutch textile industry, but as no single town would really be justified in maintaining its own aerodrome, three towns have joined forces: Oldenzaal, Enschede, and Hengeloo. A limited company has been formed, the shareholders being the three municipalities, and now the aerodrome flourishes and the textile industry is in rapid communication with the rest of the world.

After an excellent lunch in the hangar at Twente we are off again, our destination being the Eindhoven aerodrome. Coffee is served en route, and this time I occupy an outer seat, the rearmost on the starboard side, facing forward. From this the view is excellent, and I am able to follow closely our course over the very attractive Dutch landscape. As we cross the Rhine (or as the Dutch spell it, Rijn) a short distance east of Nijmegen, we obtain a fine view of this mighty river. Eindhoven is reached in three-quarters of an hour, and as at Twente crowds of people have come to see the two famous aeroplanes. Eindhoven is, as many of our readers will know, the home of the Phillips company, and also of a large tobacco industry, and the good people of Eindhoven are certainly air-minded. "Boon" Sillevis is decorated with a laurel wreath as a token of admiration for his good work.

In the Douglas

At Eindhoven the Douglas is refuelled, and I take the opportunity of a chat with the pilots, Parmentier and Moll, who will fly the machine in the England-Australia race. Mr. Moll tells me that they expect to be in England about a week before the start of the race. When all is ready I take my seat in the Douglas. I have been given the very front seat on the starboard side. Opposite me is Mr. Fokker. Each of us is sitting but very few feet from a "Cyclone" engine, yet conversation is easily possible. Not only so, but we can hear what people sitting four or five seats farther aft are saying. The Douglas cabin is certainly a marvel of quietness. One notices a slight yawing from side to side, which is not, however, sufficient to be felt but is only discovered if one happens to be watching a wing tip against the horizon. We are certainly travelling fast. Exactly how fast one has no means of knowing, as there is no A.S.I. in the cabin.

Flying at 700 m. (2,300 ft.) we are in calm air and there is no signs of bumps. The weather is beginning to change, and ahead are dark rainclouds. Mr. Fokker calls my attention to the fact that the wheels are coming down, and a few minutes later we touch very gently on the smooth surface of the Flushing aerodrome, which is situated quite close to the familiar quay. Along one side of the aerodrome a slope forms a natural grandstand, which is crowded with people.

At Flushing I go on board the F.36 once more, and soon we are heading for Haamstede, on the island of Schouwen, crossing the estuary of the East Schelde en route. The distance is short, and in a few minutes we are down once more. Haamstede is a KLM aerodrome, and a new restaurant building has recently been erected there. It is extremely cosy and comfortable, and over sandwiches and liquid refreshments served there one has an opportunity to discuss Haamstede, which apparently is the terminus of one of the shortest air routes in the world: Haamstede-Waalhaven. The route, one is informed, is used extensively by the peasants, who find that they can get to Rotterdam in a few minutes, whereas previously it was half-a-day's journey by boat and tram. The aerodrome is situated among sand dunes, and must be a charming spot during the summer months.

From Haamstede we make for Waalhaven, the Rotterdam aerodrome. The trip is uneventful, and the weather is gradually deteriorating. From the air a fine view of the extensive harbours and docks of Rotterdam is obtained, and shortly before reaching Waalhaven we overtake a Fokker F.8, which the F.36 "leaves standing." The stay at Waalhaven is short, as evening is approaching, and the last stage, back to Schiphol, I complete in the F.36, which drops us gently to earth at 5.20 p.m.

In an afternoon I have seen more of Holland than otherwise I should have seen in several years, and the experience has been a most interesting one. If I were asked which of the two machines I prefer, I should have some difficulty in coming to a decision. They cannot really be compared. The Douglas is undoubtedly the "last word," it is fast and it is quiet. On the other hand, there is something very solid and confidence-inspiring about the Fokker F.36. The huge depth of wing spars and the varnished plywood covering combine to give an impression of strength. Yet the machine has a cruising speed of more than 150 m.p.h. The Douglas probably cruises at about 190 m.p.h. Incidentally, Mr. Plesman, the managing director of the KLM, tells me that in the MacRobertson race the Douglas will be flown with its standard cabin equipment, just as it is going on the air routes. The F.36 will probably be seen at Croydon fairly soon.

A SILENCING DEMONSTRATION

New and Effective Silencer for Aeroplane Engines

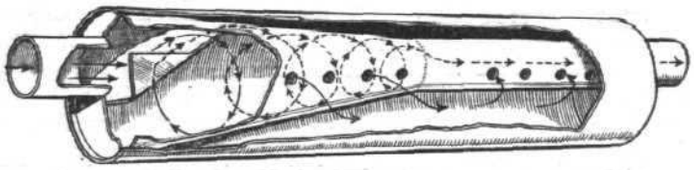
SILENCING aeroplanes is not, as many people seem to think, just a problem of removing the exhaust noise of the engine. This fact was brought out very forcibly during a demonstration of the latest silencer produced by C. G. Vokes, Ltd., at Hanworth on September 19. The demonstration took the form of running up a Cirrus-engined machine on the ground and of flying tests of a D.H. "Leopard Moth" and an Airspeed "Courier." In the former case there did not seem to be a very great difference between this method and others with a fairly efficient silencing system. The exhaust noise had certainly been largely reduced, but the degree of reduction was not so astounding as that in the "Courier." In this case the machine was flown at varying heights over the observers first with the silencer and then with the normal exhaust system. With the silencer there was very little noise indeed, and when the machine was flying at 500ft. anyone on the ground might quite well have been pardoned for thinking that it was only a motor car passing along a nearby road. The reduction of noise in the cabin was equally outstanding, and conversation was easily carried on. In the case of the "Courier" the weight of the silencer is about 16 lb., and the reduction in r.p.m. due to increased back pressure in the engine was about 50. Mr. Vokes told us that a noise reduction of 30 decibels had been obtained with many different engines.

A great deal of experiment has been carried out by this firm with silencers suitable for use in the R.A.F., and the exhaust noise of a R.R. "Kestrel" engine using two silencers weighing some 30 lb. each has been reduced from 109 to 79 decibels. For commercial use the reduction in noise is very important indeed, as passengers will only fly when the machines in which they can do so are both quiet and comfortable. For military use the possibility of having bombing aircraft, which it is very difficult to detect by audible methods when they fly at high altitudes, opens up new ideas in strategy.

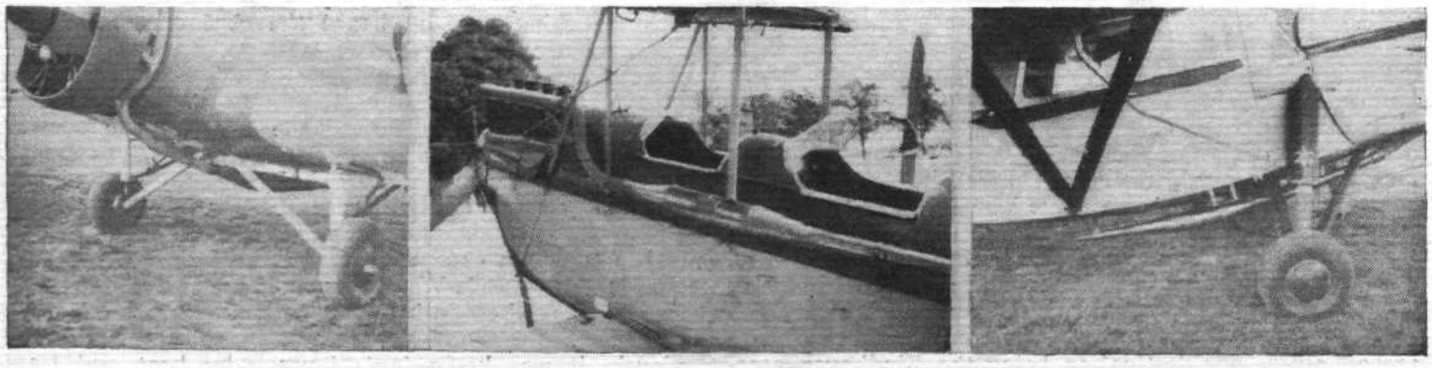
Finally, from the point of view of the non-flying public, there is everything to be said for silencing both military and commercial aircraft. The majority of silencers have hitherto created a somewhat greater back pressure than the engine designers would sanction for general use, a defect which through the resultant loss in performance also antagonised the aircraft designer.

The Vokes' silencer works on the principle of smoothing out the pulsating movements of the exhaust gases by creating a whirling stream by means of vanes set in the silencer. The creation of this steady whirling stream, in the centre of which is a vacuum, absorbs the noise.

The next step will have to be a reduction in the noise caused both by the airscrew and the mechanical parts of the engine. The latter has very greatly been improved by enclosing the valve gear and the use of complete cowling, but the former has not so far been improved to any great extent except by the use of four-bladed airscrews. In this connection it is worth noting that of all the silencing experiments we have witnessed during the last few years, those carried out with radial-engined aircraft have apparently proved more satisfactory than those with vertical engines. We attribute this to the fact that in the radial engines the noise due to the air thrown back by the airscrew is regular in intensity, particularly when a ring-type cowling is fitted, whereas in the vertical engine, like that in the "Leopard Moth," the noise is very irregular and made more prominent through the buffeting of the cowling every time an airscrew blade passes it. The "Blanvac" silencer is patented in all countries. C. N. C.



A sketch which shows how vanes are arranged inside the "Blanvac" silencer which damp out the pulsations and create a steady whirling stream.



Three aeroplanes with the "Blanvac" silencer fitted in the exhaust system. (Left to right), an Airspeed "Courier" (Siddeley "Lynx"); A D.H. "Moth" (Cirrus III); and a D.H. "Leopard Moth" (Gipsy Major).

COBHAM'S INDIA FLIGHT ATTEMPT

Tragic First Refuelling-in-the-Air Flight to India: Forced Landing at Malta Tanker Crashes

SIR ALAN COBHAM and Sqd. Ldr. Helmore had to turn back while refuelling over the sea beyond Malta last Saturday evening. Their throttle connection broke, apparently putting their engine out of use. Sir Alan promptly turned back and by keeping the undercarriage of his Airspeed "Courier" retracted, and thus extending his glide for as far as possible, was able to reach the aerodrome. He landed with the undercarriage still up, presumably in order to avoid turning over, and little damage was done.

Sir Alan had left Portsmouth early on Saturday morning, after postponing the start from Friday morning owing to an adverse weather report from Malta. He made successful contact with a Handley Page W.10 after taking off and took on board some 90 gall. of petrol. A telegram from him states that he had a magnificent flight to Malta over the clouds and arrived there at 4.15 p.m. G.M.T.

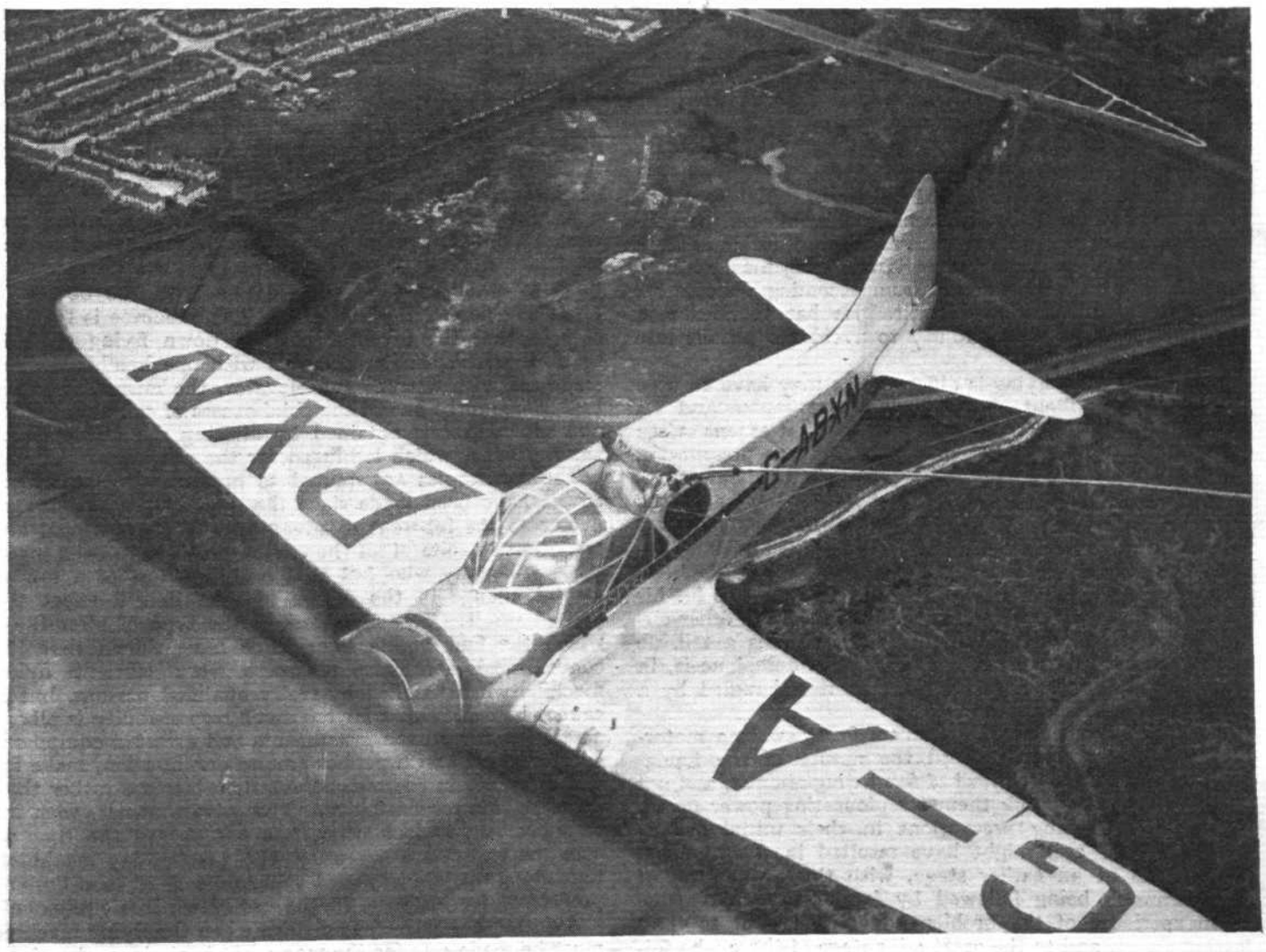
This forced landing was overshadowed by the news that the W.10, "Youth of New Zealand," used for the refuelling at Portsmouth, crashed on its way to Coventry during the same afternoon and that the four occupants were killed. Those who lost their lives were: C. H. Bremridge, pilot; J. Donovan, engineer; A. Littlejohn, rigger; and D. A. Harington, apprentice. Eyewitness accounts seem to point to the fact that, while flying over a field near Aston Clinton, a few miles from Aylesbury, Buckinghamshire, the W.10 suddenly went into a very steep climb and then on to its back In that position some part broke away and on crashing the machine immediately caught fire. Rescue work was impossible and the bodies were burned beyond recognition.

This W.10 was one of the early Handley Page air liners, two of which are being used by Sir Alan's National Aviation Day Display. It was first registered in March, 1926. After completing the refuelling at Portsmouth it was flown to Ford, where the extra tanks were taken out and the machine put back into order for joy-riding as a 16-seater.

During the Thursday afternoon before the start we flew alongside Sir Alan during a refuelling practice. We were struck with the smartness of the manœuvre and the speed with which it was carried out. A string carrying a toy balloon half-filled with water was let down from the tanker. Sqd. Ldr. Helmore standing up through a hole in the top of the "Courier" caught this with comparative ease when Sir Alan, who was flying the "Courier," side-slipped towards it. Then a light cord was pulled down and then the hose pipe. This ended in a tapered nozzle which Sqd. Ldr. Helmore held tight down into a tapered rubber mouthpiece while the fuel was flowing. Some hundred gallons could be taken on board in this way in about nine minutes.

The "Courier" is now being shipped back to England, and Sir Alan and Sqd. Ldr. Helmore are on their way by boat and air. No decision has yet been announced as to future plans for the flight, but it is hoped that a further attempt will be made.

Pub in "Shade Rock" - Naval Short.



FILLING UP. A unique photograph taken, from the "Youth of New Zealand," showing Sqd. Ldr. Helmore holding the hose into the mouthpiece ready for refuelling while flying under the tanker, whose bottom wing comes into the picture on the left. (*Flight* Photo.)

PRIVATE FLYING

A SECTION FOR OWNER-PILOTS AND CLUB MEMBERS

NOTES
by
LORD SEMPILL
A.F.C., F.R.Ae.S.

PROGRESS in all forms of mechanical transport, as in other spheres, has always been due to the enterprise and pioneering spirit of the few, and it is only when the vehicle has become, to all intents and purposes, "foolproof," that the general public begins to use it to the full extent of its possibilities. It has been so in the case of the bicycle and the motor car, and the principle applies in no less a degree to the vehicles of air transport.

Convincing the Public

WE all admire those persistent pioneers who seek fresh experiences even at risk to life and limb, but it is the phlegm of the "man in the street" which influences the designers and manufacturers to provide really safe and practical machines. The process of convincing the average person that flying is safe and practical may prove to be a greater problem than was the case with the various means of surface travel. It will naturally take longer for the public to assess the capability of the vehicle which operates in an unaccustomed medium. The would-be motorist may not have a mechanical mind, and he cannot fail to realise that the records of road accidents indicate that motoring can be a slightly dangerous pastime, but he is in no whit deterred from becoming a motor car owner as soon as means permit. He has confidence in the car and in his own ability to avoid the pitfalls into which others fall.

His attitude to flying is different; he may have an urge to experience flight, but he does not understand its problems. He cannot readily gauge to what extent safety in aviation is due to the pilot and how far present-day aircraft are fundamentally safe. The records of our organised air lines seem to prove that flying is less hazardous than surface transport, but he knows that our air liners are only entrusted to pilots of proved skill and long experience. In other words, the average man is doubtful of his own ability to control the aircraft available for his use. And in this connection, as in a variety of other circumstances, the prescience of the majority is a reliable guide to the actual state of affairs. The aeroplane is, in fact, only a safe machine so long as it is handled by a skilful and careful pilot.

Long before the Wright Brothers first flew in a motor-driven machine they realised the nature of the fundamental difficulties of control of fixed wing aircraft, and not only have we to thank them for pioneering power flights but also for taking precautions in their initial experiments. Their zeal might have resulted in their leaving the ground at an earlier stage, with the possibilities of their triumph being followed by fatal consequences due to inexperience of the problems involved. But to their lasting credit, and to the great advantage of those who followed in their footsteps, they first studied the problem and then found means to control the tendency of the aeroplane to stall. This tendency has remained a limitation in greater or less degree with every aeroplane that has been constructed since that day.

It is of this fundamental characteristic of the conventional type of aircraft that the ordinary person is shy, although he does not, perhaps, clearly understand its significance. Many attempts have been made to eliminate this drawback, both by straightforward design and by the addition to the normal wing surface of such fitments as slots.

Two Interesting Types

ALL these efforts have, so far, been palliatives rather than cures. The successful trials of the Mark V Pterodactyl, a machine on which its designer, Captain G. T. R. Hill, has given many years of research and experiment, were, therefore, of particular interest. The machine has many points of appeal to the would-be private owner, although this latest model was built to military requirements, and its great advantage from a private flying point of view is that it does go some way towards solving the problem of the stall and incipient spin.

Another interesting machine, which was described last week in *Flight*, constructed by the French experimenter, M. Henri Mignet, is also the outcome of drastic modifications to standard fixed wing design with the object of producing non-stalling qualities. This machine is remarkable in that the inventor has cut down flying controls to those which can be operated with one hand. He has dispensed with ailerons and elevator, the misuse of which he declares to be one of the chief causes of spinning. Fore and aft control is obtained by altering the incidence of the top wing, which is hinged for the purpose.

These examples are quoted to indicate that persistent efforts have been made since the days of the Wrights to overcome the inherent disadvantages of conventional aircraft, but in spite of all the efforts which have been made there are many who feel that nothing short of a fundamental change in the design of aircraft will effect the desired result. The successors to the type of aircraft on which the first flights were made have shown that the conventional aeroplane makes a very efficient flying machine when handled by really qualified persons, but it cannot be denied that far too much responsibility is placed on the pilot. All the instruments and assorted equipment which, coupled with perfect ground organisation, make for greater safety in commercial aviation increase rather than decrease this responsibility. The private owner, with his own business to look after, has not always the time to gain the experience necessary with present-day machines, but, given the less wayward vehicle, he could soon become proficient, for instance, in the use of wireless equipment.

Aviation has arrived at a stage when the flying machine must be made safe for the many. It is obvious, therefore, that every encouragement should be given for the design of machines which are based on principles of inherent stability.

FROM THE CLUBS

Events and Activity at the Clubs and Schools

MIDLAND

Thirty-six hours fifty minutes flying was carried out at Castle Bromwich last week, and Miss B. Franks made a first solo. Cross-countries were made to Exeter, Desford, Ford, Tollerton, Sherburn, and Wittering.

CAMBRIDGE

Flying times for the week have been above the average for the time of the year, and several cross-country and charter flights were made. One new member, Mr. A. T. Vulliamy, joined Marshall's School, and Mr. David Garnett, the author, flew one of the school "Moths" as a change from his Klemm.

WITNEY AND OXFORD

Last week Mr. R. F. A. Edelsten returned to Witney after a trip to Baghdad in his Bristol Fighter. Apparently his method of refuelling in the air—by means of two-gallon tins!—was entirely successful, and the Falcon III never missed a beat. Altogether a very stout effort on the parts of both pilot and machine.

Bad weather stopped flying on three days, but Mr. E. P. Pridgeon passed the tests for his "A" licence.

SOUTHERN

The club machines flew 33 hours during last week. Mr. R. Norwood has returned from a flying visit to Coblenz and Paris in his "Moth Major," and visitors included Lord Amherst in an Avro "Commodore" belonging to B.A.N.Co. Mr. Stavers Tiltman, architect and surveyor for the Brighton, Hove and Worthing Municipal Airport, inspected the site in this machine.

A dance will take place in the clubhouse on October 24.

BRISTOL AND WESSEX

During the first three weeks of September the Bristol Club flew 150 hours, and four new pilot members have joined the club. One of them, Mr. Bhandarkar, is an Indian student who is taking a "B" licence course at Bristol.

Mr. E. P. Mortimer completed the tests for an "A" licence during the week. Lady Blanche Scott Douglas has taken delivery of her Gipsy Major "Hawk," in which she proposes to fly to India next November with F/O. Ogden, the club's assistant instructor.

HERTS AND ESSEX

The club has now purchased a Gipsy II metal "Moth" fitted for "blind" and night flying. The charge for "blind" flying is £2 per hour, and for "B" licence night flying instruction and test it is £20, including insurance.

The next competition, for the "Margaret Blackshaw" Challenge Cup, presented to the club by J. Leslie Williams, Esq., will be held on Sunday, September 300. This is a pin-pointing competition, after which a return must be made to the aerodrome at 2,oooft. and a landing made without side-slipping or "rumbling."

READING

A successful flying season was rounded off last Sunday by an informal tea party at the Reading Aero Club, and during the afternoon the "W. J. Barnes" Challenge Cup was presented to this year's winner—or winners—for the result was a tie between the honorary secretary of the club, Mr. C. A. Nepean Bishop, and Mr. G. L. Armitage. Mr. Armitage only learned to fly during the early part of this year, and, though the hours previously flown by each competitor were taken into consideration, his was a very stout effort.

At dusk Mr. F. G. Miles made a successful first flight in the new Miles "Falcon" (Gipsy Major).

CINQUE PORTS

Three new members joined the club last week, and flying times amounted to just over 60 hours. Messrs. D. L. Campbell, J. F. Holmes, D. C. Palmar, R. H. Cassels, and R. W. Rumbold made successful first solos, and Mr. Holmes also obtained his "A" licence just before leaving for India.

Owing to wind and low cloud the party of German friends who were to visit us on Saturday was somewhat broken up. Mr. and Mrs. Lammertz with Herr Farnsteiner managed to get through on Saturday in a "Puss Moth," but the rest were held up. However, they arrived safely on Sunday morning with three machines, and stayed until Monday.

Mr. Leslie Cliff is now permanently on the club staff as third instructor.

SOUTHEND

After pageants, At Homes and garden parties, members of the Southend Flying Club continue their usual flying activities, the routine being punctuated by the hourly arrivals and departures of the "Fox Moth" and "Scion" on the Southend-Rochester Air Service.

Three members have just passed their "A" licence tests, and one, Mr. Stevens, has recently obtained two "firsts" in practical and theoretical design at the Aeronautical College. Miss Rankin, after six hours' instruction, has gone solo, and is the first lady member to do so. Four other first solo flights have been made.

NORTHAMPTONSHIRE

Flying times for the past week have reached a total of 30 hours.

On Thursday, September 20, the club co-operated with the organisers of a fête at Bedford, held in aid of local charities. The five machines taking part from the club were piloted by Miss E. D. Tyzack, Mrs. W. Crossley, Messrs. A. J. Linnell, G. Linnell, and C. Hayne. A feature of the show was an exhibition given by Mr. G. E. Collins in his "Rhonadler" glider, which was towed from Sywell to Bedford by a "Moth" piloted by Flt. Lt. T. Rose, and released over the display.

A large number of spectators were entertained last Sunday by a display given by the Northampton Model Aero Club on the aerodrome.

BROOKLANDS

Cross-countries have been very popular with our members this week, and the blind flying course, under Capt. Mackenzie's supervision, has been received with great enthusiasm. Another Gipsy "Moth" has been added to the fleet, and there are now five instructional machines.

Mr. Chizik, who learnt to fly at Brooklands, has returned from Palestine, and one of his objects is to buy a machine which he will take back to further the interest in civil aviation there.

In spite of squally weather flying times have kept above average, with 85 solo hours and 45 dual, while two first solos were made. Mr. Brookes, an intrepid globe-trotter, is completing tests for his "B" licence.

LANCASHIRE

During July and August the Lancashire Club's flying hours showed an increase of over fifty per cent. on last year's figures for the same period, and the months were marked by "Toffee" Hall's third win in the S.B.A.C. Trophy Race. He flew the club's staggered "Cadet" and brought a fine cup and a cheque for £50 back to Woodford. Miss Barnard, too, managed third place at the Liverpool Club's arrival competition with the "Avian."

The direct-control Autogiro will definitely be in use at the club after the initiation ceremonies on October 6.

Next Saturday the Pemberton and Rodman landing competition will be held, followed by an informal dance. The annual ball will be held on November 23 at the Midland Hotel, and the club hopes that Lord Derby will be host on that occasion.

HATFIELD

The flying time at the London Aeroplane Club for the past week was 80 hours 50 minutes.

The aerobatics and forced landing competitions were held under almost perfect weather conditions on Sunday, September 16, and the judges were Messrs. R. W. Reeve, G. M. Cox, and W. E. P. Johnson. The winner of the Aerobatic Cup (presented by Mr. P. H. B. Sprosen) was Mr. E. M. Wright, with 88⅓ per cent.; Mr. E. A. Beale was second with 86 per cent., and Mr. F. H. Matusch third with 78 per cent. There were eight starters for this competition, and they were required to do spins, loops, stalled turns with engine, flick half-rolls, slow rolls and half-rolls off the loops.

The forced landing competition, for the cup presented by Mr. M. J. Young, was won by Mr. E. A. Beale, in the senior group, and Mr. R. J. Falk was second. The junior group was won by Mr. A. H. W. Batten. Competitors had to throttle back at 1,500 feet and land as nearly as possible to a cross-wind line. The general standard shown during these competitions was high.

Private Flying

Useful Encouragement

With the object of developing interest in the flying movement, the Committee of the Aero Club of Otago, New Zealand, has recently inaugurated a scheme under which entrants to the flying school will be required to pay £1 for twenty minutes' instruction. The students who show the greatest promise will then be selected for free tuition up to "A" licence standard.

Party Week-ending

Groups of people who feel that a week-end in either Paris or Brussels might be a good idea will be interested to learn that Olley Air Service, Ltd., are prepared to take a minimum of five passengers to either city at a very reasonable figure. The return fare quoted is 6 guineas, and the machine will leave Croydon any time after 2 p.m. on Saturday and return at any time on Monday morning.

In Guernsey

After the visit of Messrs. Naish and Turner to Guernsey with a "Puss Moth" and an Avro "Cadet"—and after their somewhat hectic adventures while returning—we learn that there is a distinct possibility that Aircraft Exchange and Mart, Ltd., may operate a school in the island.

At the invitation of the Guernsey Aero Club the pilots made a "test" of the landing ground at L'Erée, which appears to be quite suitable for light aeroplanes, and made a number of flights with local people. Slight alterations and improvements will be made to the ground, and the Club is applying to the appropriate court for a licence.

Judging from the fact that Naish and Turner were prevented by the Customs people at the last minute from returning, just because the field was not a licensed aerodrome—how can a field be licensed until it is tried?—Guernsey has its local obstructionists, and all is not yet "plane" sailing.

IMPROVING INDIA'S AIR LINES

Details of the Civil Aviation Works Programme Approved by the Indian Government

WE have already briefly referred to the proposals for increased expenditure on Civil Aviation in India. Below we give a summary of the Civil Aviation Works Programme which has been approved by the Indian Government.

An expenditure of Rs.53,49,000 will be spent on (A) works of first urgency, as follows: Aviation, Rs.43,95,000; meteorology, Rs.5,66,000; wireless, Rs.3,88,000. For works of secondary urgency (B), Rs.39,08,000 is set aside, thus: Aviation, Rs.32,75,000; and wireless, Rs.6,33,000. This is a total of Rs.92,57,000. Aviation (A) includes Rs.4,70,000 for improvement of aerodromes, Rs.9,20,000 for hangars, Rs.11,51,000 for new aerodromes and landing grounds, Rs.5,81,000 for buildings, and Rs.4,92,000 for lighting. In aviation (B), Rs.5,60,000 is for improvement of aerodromes, Rs.3,60,000 for hangars, Rs.8,60,000 for new aerodromes and landing grounds, and Rs.10,50,000 for lighting.

This covers the completion or partial completion of organisation on the following air routes:—

(1) KARACHI-CALCUTTA-VICTORIA POINT.—The existing organisation on this route is already fairly extensive. Additional organisation which will be provided comprises:—

(a) Runways and surface treatment at those aerodromes which have proved unserviceable in the monsoon, including Delhi, Gaya, Akyab and Bassein.

(b) General improvement of aerodromes. Akyab aerodrome will be enlarged and provided with buildings. Provision is made for improvements at Calcutta, Chittagong, and Rangoon, which in some cases may take the form of new aerodromes.

(c) Hangars. To meet the demand created by the ever-growing size of commercial aircraft large hangars of 140ft. span will be provided at Karachi, Allahabad, Calcutta, and Rangoon, and a smaller hangar at Akyab.

(d) New landing grounds. A few new emergency landing grounds will be provided along the route where the present distance between aerodromes and landing grounds is too great for regular and safe operation. Landing grounds will also be provided in the Irrawaddy Valley to provide an alternative to the Burma coast route during the monsoon.

(e) Buildings. General office buildings and quarters will be provided as necessary.

(f) Lighting. The main aerodromes, Karachi, Delhi, Cawnpore, Allahabad, Calcutta, Akyab and Rangoon will be completely equipped for night flying, including floodlights, boundary lights, obstruction lights and illuminated wind indicators. Certain intermediate landing grounds between Karachi and Calcutta will be equipped with boundary lights, obstruction lights, illuminated wind indicators, and location beacons. Later intermediate route beacons will be established between Karachi and Calcutta, so that this section of the trans-India route will be completely equipped for regular night flying.

(g) Meteorology. New observatories and quarters, including the establishment of the Karachi Meteorological Office in the proposed administrative building at the air port.

(2) KARACHI-BOMBAY-MADRAS.—Very little special organisation has been provided on this route. The new organisation will comprise: (a) Runways and surface treatment at Bombay (Juhu). (b) General improvement. Completion of landing area at Juhu. (c) Hangars. Bombay and Madras. (d) New aerodromes and landing grounds. About six new landing grounds, including a civil aerodrome at Ahmadabad. (e) Lighting. Complete equipment of Bombay and Madras for night flying, to the same standard as the trans-India aerodromes. (f) Wireless. Construction of new wireless stations and modification of existing stations to provide a complete aeronautical wireless service, including direction-finding.

(3) BOMBAY-CALCUTTA.—Provision is made for the complete equipment of this route for night flying, including the establishment of aerodromes, landing grounds, wireless stations, lighting of aerodromes, and route beacons. This organisation will take a place secondary to the two main air routes.

(4) KARACHI-LAHORE.—Provision of new landing grounds, hangars, and wireless stations.

(5) CALCUTTA-MADRAS.—Provision is made for the commencement of organisation on this route by the provision of landing grounds.

Past and Future Developments

Last year witnessed the successful inauguration of the Indian Transcontinental section from Karachi to Rangoon of the Imperial Airways England-Australia lines; its further extension to Singapore; and the foundation of Indian National Airways with their daily feeder services between Calcutta and Dacca, as well as their duplication of the section between Calcutta and Rangoon.

But this by no means represents the whole of the year's achievements. The consistent improvement of aerodromes; the lighting of the Karachi and Jodhpur aerodromes to enable the service on this section of the Transcontinental route to be speeded up by night flying; the development of directional wireless; the institution of a flat rate throughout India and Burma for air mails, which, together with the extension of the regular lines, have contributed enormously to the growth of the number of letters and packages carried. These are among other notable achievements.

The near future will witness the extension of Tata's Karachi-Madras service to Colombo; the inauguration of a new feeder line between Karachi and Lahore; and possibly two new main lines, one between Bombay and Calcutta and the other between Calcutta and Madras.

The efficiency of Tata's service is recorded as 100 per cent., while Imperial Airways and the Transcontinental maintained their weekly service with punctuality, 75 per cent. of the arrivals being on schedule time and only two per cent. more than twenty-four hours late. During the whole year not a single letter was lost.

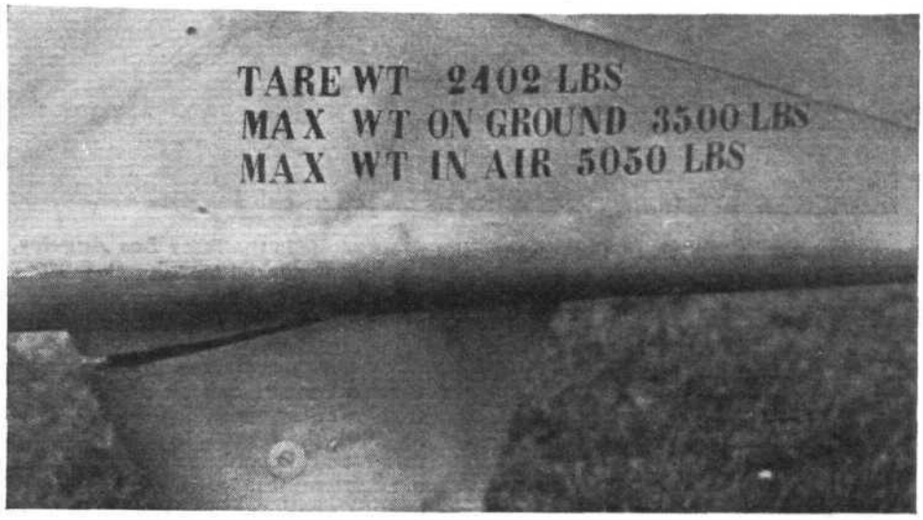
During 1933, 15,240 hours were flown by Indian craft. The number of accidents was twenty-nine, of which only four were major. These figures are all the more striking when it is realised that altogether nearly 1,200,000 miles were flown by Indian commercial and club aircraft.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Stack Still Busy

Continuing his dashes over Europe—reported in our last issue—Capt. Neville Stack accomplished another fine flight last week in his Miles "Hawk Major" ("Gipsy Major"). Leaving Croydon at 7.20 a.m. on Friday he flew, by way of Marseilles, to Rome, and after a stay there of one hour he continued on to Naples, which he reached at 5.10 p.m. He thus flew about 1,300 miles in 9 hours 50 minutes (including stop), at an average of 147.2 m.p.h. Next day he started on the return flight at 8.10 a.m., and, making a stop of half an hour at Lyons, reached Heston Airport at 6.10 p.m., or ten hours later, his average speed being 144.4 m.p.h. He was flying in a storm all the way from Paris, and crossed the Channel at an average height of 10ft.! Capt. Stack has nothing but praise for the "Hawk," which he considers an ideal machine for long tours—not only from the performance point of view, but for comfort as well.



AN INNOVATION: The official weights allowed by the Certificate of Airworthiness on Sir Alan Cobham's Airspeed "Courier" as prepared for refuelling in the air. This is probably the first time "Max Wt in Air" has appeared on any aeroplane. (*Flight* Photo.)

Twenty-five Years Ago

From "Flight" of September 25, 1909

"The nationality of Mr. Henry Farman has time and again been called into question. Any doubt should once and for all be disposed of by the following announcement in the *London Gazette* last week:—'The King has been pleased to give and grant unto Henry Farman, Esq., His Majesty's royal licence and authority to accept and wear the Cross of Chevalier of the Legion of Honour, conferred upon him by the President of the French Republic, in recognition of valuable services rendered by him.'"

American Amphibian for France

M. Arnaud Esders, a French aviation enthusiast, has taken delivery of one of the latest types of Douglas "Dolphin" amphibian fitted with two supercharged "Wasp" engines. The machine has been named *Jade Blanc V.*

"Aerial" Train's Long Flight

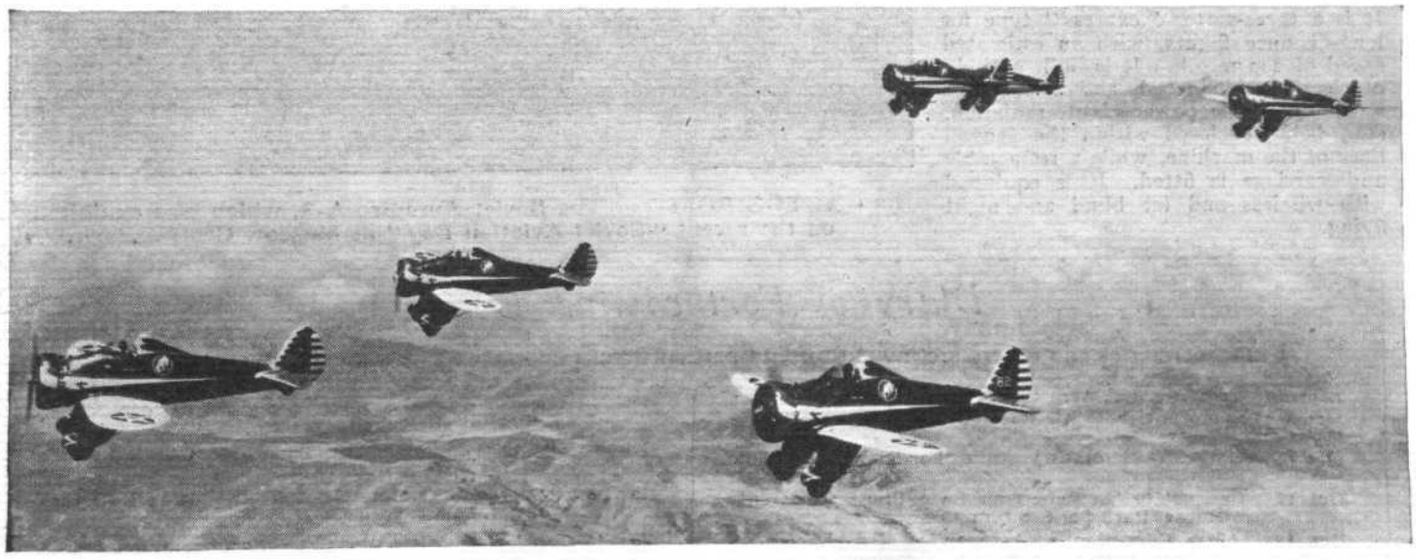
A new Soviet record for distance flying has been set by the glider air-train which arrived at Koktebel from Leningrad on September 7 for the glider meet. It covered a flying distance of 2,755 kilometres (about 1,800 miles). The air train consisted of a P-5 aeroplane piloted by Krichikov, two G-9 gliders, and a new two-seater glider designed by Domrachev. The route of the flight was Leningrad, Moscow, Tambov, Koslov, Stalino, Lugansk, Zaporozhe and Koktebel.

Miss Britain III's New Record

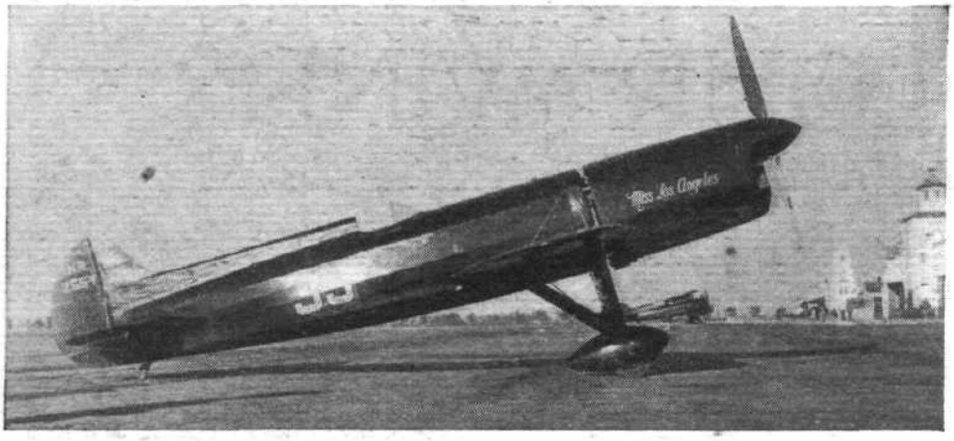
Mr. Hubert Scott-Paine established a new world's record for single-engined motor boats at Venice on September 18, when he piloted *Miss Britain III* (and her Napier engine) over a measured mile at an average speed of 110.1 m.p.h.

International Air Convention

Switzerland has decided to adhere, as from October 1, to the Convention relating to the Regulation of Aerial Navigation. The I.A.C. includes: Australia, Belgium, Bulgaria, Canada, Chile, Denmark, Finland, France, Great Britain and Northern Ireland, Greece, India, Iraq, Irish Free State, Italy, Japan, Norway, New Zealand, Netherlands, Poland, Portugal, Roumania, Saar Territory, Siam, Sweden, Switzerland (and Liechtenstein), Czechoslovakia, Union of South Africa, Uruguay, and Yugo Slavia.



FANCY SKY EAGLES: A group of new high-speed, single-seater Boeing P-26A pursuit 'planes, attached to the 95th Pursuit Squadron, make a cross-country flight from March Field, California.



FLOR DE AERIAL: This cigar-like monoplane is the *Miss Los Angeles*, built for the American racing pilot Roy Minor, and to which we refer below.

The Royal Italian Air Force

Signor Mussolini, as Minister of Aviation, has decided to lower the age limit for the marriage of military air pilots from 30 to 22 years. They will also be able to marry after eight years' service instead of ten.

New American Fleet Fighter

The Curtis BF2C-1 Navy Fighter, illustrated in *Flight* of May 10, 1934, has been adopted as a standard type by the U.S. Navy. A retractable undercarriage is fitted to this machine, which is a biplane powered with a Wright "Cyclone" F engine of approximately 700 h.p.

Small and Fast

Illustrated on this page is *Miss Los Angeles*, a small racing monoplane, built for Roy Minor, the American racing pilot, which won second prize in the Thompson Trophy Race at Cleveland, Ohio, recently. The machine was built by the Lawrence W. Brown Aircraft Co., of Los Angeles. On the power of a Menasco "Buccaneer" C.6.S. supercharged engine, the machine flies at between 250 and 270 m.p.h. A single-seater fighter version is being developed.

New Soviet All-metal Aeroplane

A fast all-metal machine, built by a group of students of the Moscow Aviation Institute, is now undergoing tests. It is a three-seater "express" type for long-distance flights, with an estimated speed of 200 m.p.h. It is built entirely of electro-welded steel, and is carefully streamlined, the power plant, radiators, etc., being enclosed within the general lines of the machine, while a retractable undercarriage is fitted. It is equipped with wireless and for blind and night flying.

Gordon Bennett Balloon Race

Sixteen competitors in this year's Gordon Bennett Balloon Race started off from Warsaw on September 23. They included three each from U.S.A., Germany and Poland, and representatives of Belgium, France, Italy, Switzerland and Czechoslovakia. The latter's balloon, *Bratislava*, descended in the evening near Kybartai (Lithuania), while two German balloons landed on Monday morning, one ten miles north of Sellin (Esthonia) and the other twenty miles north of Dorpat (Esthonia). One of the Polish balloons fell into the lake near Nyslott (Finland), and the occupants had to swim for their lives. The American balloon, *Buffalo*, landed in Soviet territory near Gdoff.

A "75" in a French Bomber

It is reported from Paris that a French 75 mm. field gun has been mounted in a large bomber high-wing monoplane and fired while the machine was in flight. The reports go on to state that the recoil had no noticeable effect on the flight of the machine.

An Unusual Accident

A verdict of accidental death was returned at the inquest, held at Limber, Grimsby, on September 18, on Mrs. D. Davy, who was killed by an aeroplane while she was making a film of the machine. One of her daughters was making a flight on the machine and she had asked the pilot, Capt. Ian Marr Johnson, to fly low so that she could take the photograph. Apparently the pilot flew lower than he intended, and the machine struck Mrs. Davy, who was killed instantly.

Air Visit to Factory

A party of London business men, including electrical and engineering experts, flew from Croydon to Speke, Liverpool, in a specially chartered Imperial Airways "Argosy" on September 18, in order to visit the Prescot works of British Copper Refineries, Ltd.—a subsidiary of British Insulated Cables, Ltd. After a thorough inspection of the works, the party returned by air, and arrived back in London before 7 p.m. British Insulated Cables, Ltd., state that they intend to make regular use of air travel to enable their clients from various parts of England to visit the Prescot works.

"AUTOGIROFF": The Soviet Autogiro A-3, which was exhibited on the recent "Soviet Aviation Day" at Moscow Central Park.

Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Sept. 29. Leicestershire Aero Club "At Home."

Oct. 6. London to Cardiff Air Race and Cardiff Ae.C. Garden Party

Oct 7 Aviation Golf Meeting Royal Porthcawl Golf Club Porthcawl

Oct. 12 Banquet to MacRobertson Race Pilots Grosvenor House, Park Lane, 8 p.m

Oct. 18 "The Education of Aeronautical Engineers." R.Ae.S. Lecture by Prof. A. J. S. Pippard.

Oct. 20. England-Australia Race for MacRobertson Prize. Start at Mildenhall.

Oct. 25. "The Compressed Air Tunnel." R.Ae.S. Lecture by Mr. E. F. Relf. R.Ae.S.

Nov. 8. "Speeds of Commercial Aircraft." R.Ae.S. Lecture by M. Louis Breguet.

Nov. 16-Dec. 2. 14th International Aviation Exhibition, Grand Palais des Champs-Elysees, Paris.

September 27, 1934. Supplement to FLIGHT

1002a

The AIRCRAFT ENGINEER

"FLIGHT" ENGINEERING SECTION

Edited by C. M. POULSEN

No. 104 (Volume IX No. 9) 9th Year September 27, 1934

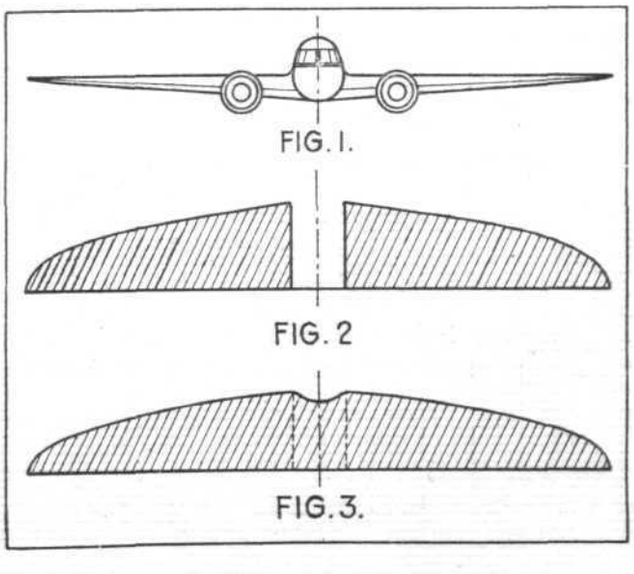
STRENGTH CALCULATIONS FOR A TUBULAR SINGLE-SPAR CANTILEVER WING

By F. Duncanson

From a description published in "Flight" of August 9, 1934, readers will be familiar with the Blackburn-Duncanson single-spar wing. The process of stressing such a wing is explained in the following article

THE methods of strength calculation and weight-estimating for a single-spar cantilever wing—first outlined in The Aircraft Engineer (Supplement to *Flight*) in March, 1929—have now been put to practical test and their validity established by direct comparison with the usual handbook methods. The following article is illustrated by a worked-out example in order to lend reality to what would otherwise be rather an academic discourse.

For purposes of illustration, the case adopted is that of a hypothetical twin-engined low wing cantilever monoplane (Fig. 1). The wing is of the straight tapered untwisted type.



The approximate formula used for the load grading is now generally accepted as giving an equivalent result to that obtainable from A.P. 970.

When it is considered that the usual stressing convention postulates that the load grading suddenly drops off to zero across the body (Fig. 2), instead of the more probable condition shown in Fig. 3, it will be seen that the crudity of this assumption rather swamps any slight differences due to refinements in load grading estimates.

The following notes and calculations show briefly how it is possible to arrive at the design and weight estimate of a single-spar wing having a tapered circular—or nearly circular—section spar situated at or near the maximum ordinate of the wing section.

Wing Structure Strength Calculations and Detailed Weight Estimate

Tapered Tubular Single-Spar Wing

Span 70 ft. 0 in. Maximum chord, 15ft.
Nett area, A = 735 sq. ft.

The plan form of the wing and the load diagram may be represented, to a close degree of accuracy, by the equation $y = kx^{\frac{1}{3}}$

When $x = 32.75'$, $y = 15'$

$$\therefore k = \frac{15}{32.75^{\frac{1}{3}}} = 4.685$$

All up weight, W = 10,886 lb., wing weight, w = 1,236 lb.
Central load, $\overline{W}$ = 9,650 lb.
Load factor, N = 7.5

$$\frac{NW}{A} = \frac{7.5 \times 9650}{735} = \underline{98.5 \text{ lb.}} \text{ per sq. ft.}$$

Equation to load diagram: $y = 4.685 \times 98.5x^{\frac{1}{3}} = 461x^{\frac{1}{3}}$

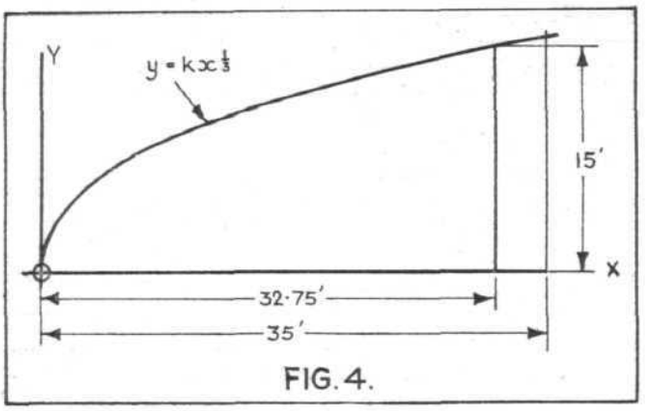


FIG. 4.

Equation to shear force diagram: $y = 461/x^{\frac{1}{3}}dx = \frac{3}{4} \times 461x^{\frac{4}{3}}$
$= 346x^{\frac{4}{3}}$

Equation to bending moment: $y = 346/x^{\frac{4}{3}}dx = \frac{3}{7} \times 346x^{\frac{7}{3}}$
$= 148.2x^{\frac{7}{3}}$

The plan form, loading, shear force, and B.M. curves are shown by Figs. 5, 6 and 7.

Relief loads due to engines, etc.:

	lb.
Weight of engine unit	1,400
Weight of half undercarriage ..	240
	1,640

Factored load = 7·5 × 1,640 = 12,300 lb.

On the starboard side the engine torque is subtracting from the relief B.M. due to the above weights. Engines give 640 h.p. at 1,200 r.p.m.:

$$\text{Engine torque, } T = \frac{33{,}000 \times 640}{2\pi \times 1{,}200} = 2{,}810 \text{ lb. ft.}$$

$$\text{Reactions at A and B} = \frac{2{,}810}{2} = 1{,}405 \text{ lb.}$$

Relief B.M. at root due to petrol and oil weight

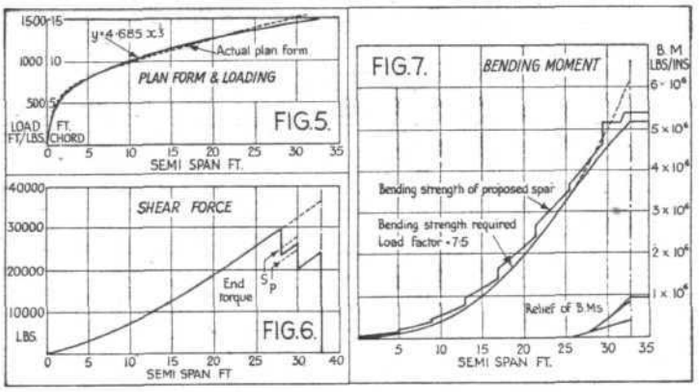
$$= \frac{7.5 \times 16.1 \times 39^2}{2}$$

$$= 92{,}000 \text{ lb. in.}$$

The relief bending moments are shown plotted on Fig. 7.

Method of Estimating the Moment of Inertia and Bending Modulus of the Spar Section

The following method enables a rapid and accurate estimate to be made of the moment of inertia of the spar section about its neutral axis.



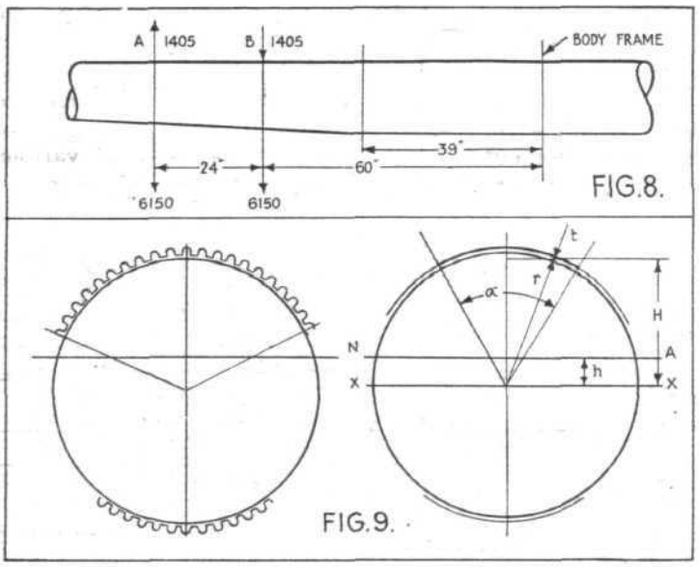
For the purpose of calculation, each corrugated arc may be replaced by a plain arc of radius equal to the mean radius of the corrugated arc and of a thickness such that the cross sections of the corrugated and plain arcs are equal.

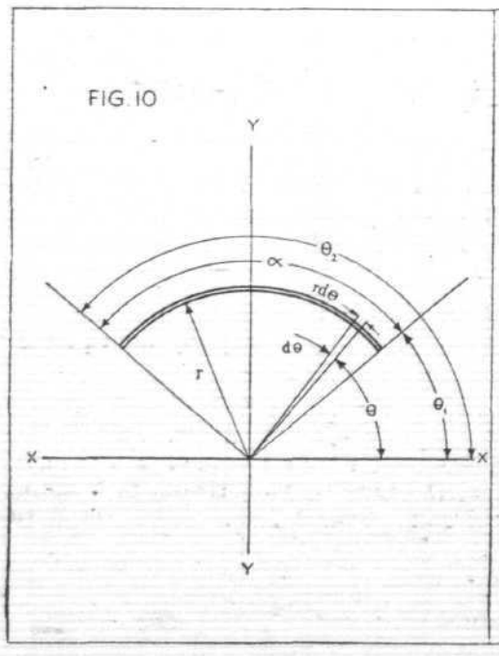
1.—To find the height of the neutral axis above the spar centre line we have:—

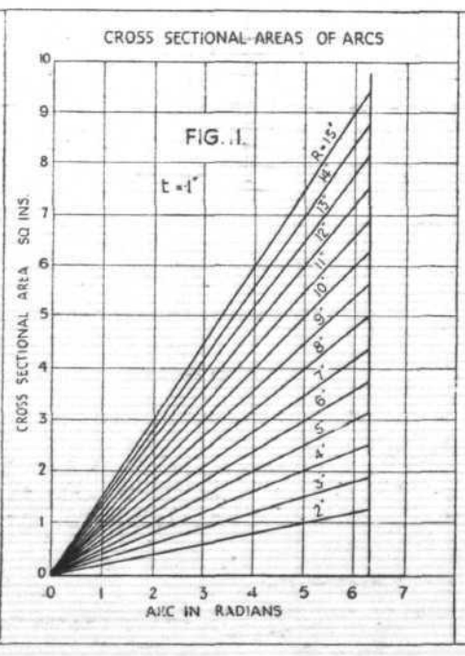
Distance of the c.g. of each arc from x x, H

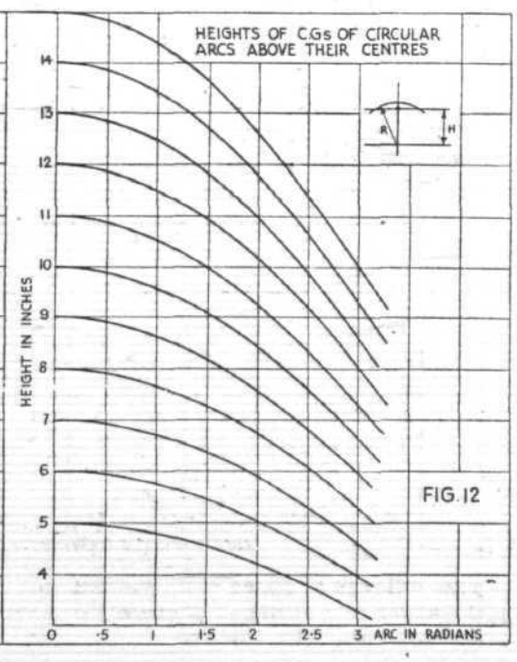
$$= r \times \frac{\text{chord}}{\text{arc}}$$

$$= 2r \cdot \frac{\sin\frac{a}{2}}{na}$$









$$2.\text{—Height of NA above x x} = 2\,\frac{\Sigma ar^2 t\,\sin\frac{\alpha}{2}}{\Sigma art}$$

3.—Moment of Inertia of an arc about x x

$$I_{xx} = \int_{\theta_1}^{\theta_2} trd\theta r^2 \sin^2\theta$$

$$= r^3 t \int_{\theta_1}^{\theta_2} \sin^2\theta d\theta$$

$$= r^3 t \left[\frac{\theta}{2} - \frac{\sin 2\theta}{4}\right]_{\theta_1}^{\theta_2}$$

$$= r^3 t \left[\frac{\theta_2 - \theta_1}{2} + \frac{\sin 2\theta_1 - \sin 2\theta_2}{4}\right]$$

Since the arc is symmetrical about YY we have:

$$\frac{\sin 2\theta_1 - \sin 2\theta_2}{4} = \frac{\sin 2\theta_1}{2}$$

and $$\sin 2\theta_1 = \cos\left(a - \frac{\pi}{2}\right)$$

$$\therefore I_{xx} = \frac{r^3 t}{2}\left[a + \cos\left(a - \frac{\pi}{2}\right)\right]$$

Moment of Inertia of arc about NA:

$$INA = I_{xx} - r\alpha t H^2 + r\alpha t(H - h)^2$$
$$= I_{xx} - r\alpha t(2Hh - h^2)$$

It has been found convenient, in order to expedite the work, to plot curves of cross sectional areas, heights of cg's and moments of inertia of circular arcs of various radii. These are shown in Figs. 11, 12 and 13 (Figs. 11 and 13 are for $t = .1$in.)

Diameter = 28in. $t = .08$in.
Developed width 1.7 P.
1st top arc, 2.3 radians
Equivalent thickness $1.7 \times .048$
$= .0817$in.

2nd top arc 1.2 radians
Equivalent thickness $1.7 \times .064$
$= .1088$in.

Bottom arc 1.0 radian. Equivalent thickness, .1088in.

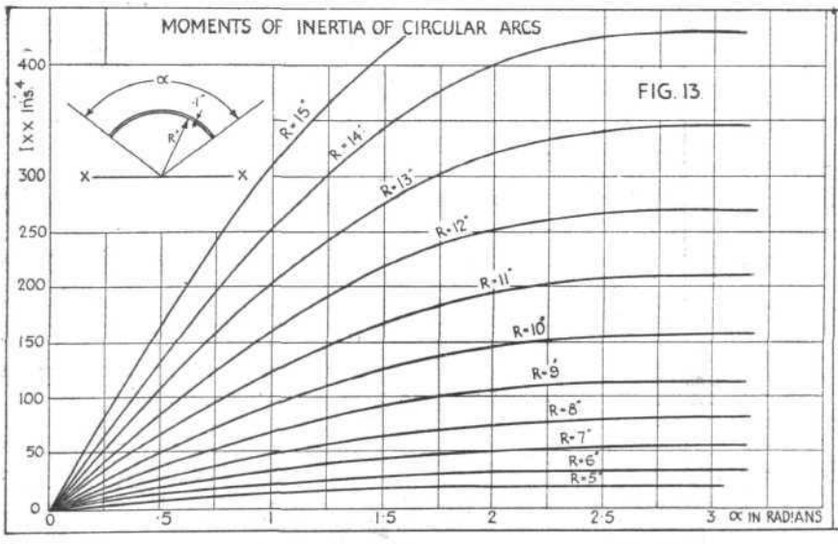
Element.	Cross Sectional Area.	Height above XX.	Moment of Area about XX.
	sq. in.	in.	
Shell	7.05	0	0
1st top arc ..	2.70	11.42	30.85
2nd top arc ..	1.87	13.52	25.3
Bottom arc ..	1.55	− 13.81	− 21.4

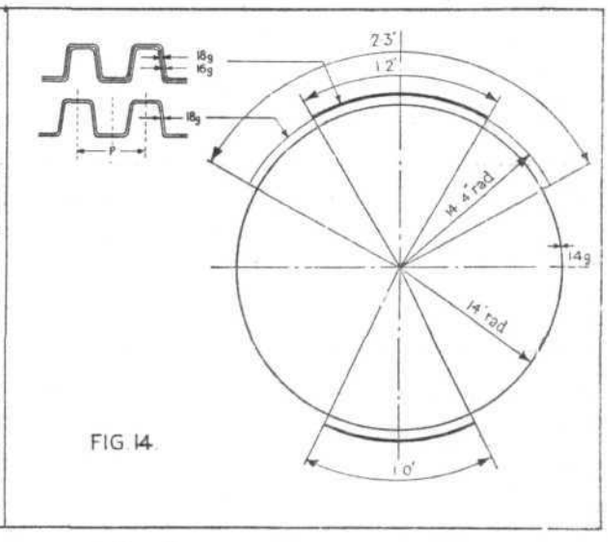
Total area 13.17 sq. in. Total moment 34.75 in.³

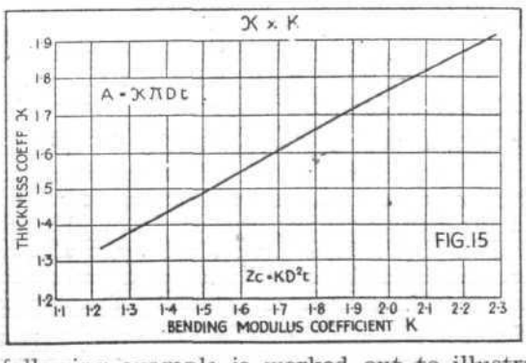
$$h = \frac{34.75}{13.17} = 2.64''$$

Element.	Moment of Inertia about XX.	Moment of Inertia about N.A.
Shell..	690	739.5
1st top arc	373	228.5
2nd top arc	346	225.7
Bottom arc	300	423.9

Total I about N.A. .. .. 1,617.6 in.⁴







The following example is worked out to illustrate the application of the above method to a section of the proposed spar near the wing root.

$$Z_c = \frac{1617.6}{11.76} = 137.5\text{in.}^3$$

$$Z_t = \frac{1617.6}{17.04} = 95.0\text{in.}^3$$

The Z_c of this particular section may be expressed in terms of a coefficient $\times D^2 \times t$.

The coefficient for this section is $\frac{137.5}{28^2 \times .08} = 2.19$

The section considered has a cross sectional area of 13.17 sq. in., is 28in. diameter and the shell thickness is .08in. A plain tube of the same cross sectional area would be

$$\frac{13.17}{\pi \times 28} = .1495 \text{ thick.}$$

The thickness ratio is therefore $\frac{.1495}{.08} = 1.869$

A number of similar cases have been computed and the results plotted on Fig. 15 which shows the thickness ratios required to obtain various Z_e coefficients.

The following procedure has been adopted in designing the spar and estimating its weight :—

At intervals along the length the gauges of the shell plating have been determined from considerations of torsional stiffness.

The Z_e coefficients have then been selected so that a proof stress of 16 tons per sq. in. in compression shall not be exceeded.*

From the diagram shown in Fig. 10 the corresponding thickness coefficients have been read, thus enabling the complete weight of the shell plating and corrugated flanges to be calculated.

(*a*) Wing span.
(*b*) Wing area.
(*c*) Thickness ratios at wingroot and wingtip.
(*d*) The positions of wing engines, fuel tanks, etc.

2. The loads on the wing structure, comprising :—
(*a*) Load per unit area.
(*b*) Load factor.
(*c*) Weight of wing engines, fuel, etc., in relation to the central load.

3. The strength/density ratio of the material used.

A wing structural weight of 8 per cent. or even less may be achieved in quite a practical design having fairly low aspect ratio, large amount of taper in chord and wing thickness, small load factor, high wind loading and the use of a material of high strength/density ratio.

DETAILS OF THE WEIGHT ESTIMATE

Item.	Large Dia. D_1 ft.	Small Dia. D_2 ft.	D_1+D_2	Plate length including butt strap ft.	Plate Area A $\frac{\pi(D_1+D_2)l}{2}$ sq. ft.	Shell thickness t	Thickness Ratio.	Equivalent thickness T	Weight lb. $144\times.103$ AT
Mid portion, inner ...	2.42	2.42	4.84	6	45.65	.08	1.89	.151	102.5
,, ,, outer ...	2.42	2.42	4.84	5	38.1	.08	1.83	.1464	82.9
1st Section, inner ...	2.42	2.12	4.54	8.25	58.9	.072	1.83	.1318	115.3
,, ,, outer ...	2.12	1.875	3.995	8.25	51.8	.072	1.76	.1268	97.5
2nd Section, inner ...	1.89	1.61	3.5	9.5	52.3	.064	1.76	.1125	87.4
,, ,, outer ...	1.61	1.34	2.95	8.5	39.4	.064	1.55	.0993	58.0
3rd Section, inner ...	1.36	1.082	2.442	8.5	32.6	.048	1.55	.0745	36.1
,, ,, outer ...	1.082	.825	1.907	8.5	25.5	.048	1.4	.0673	25.5
Tip	.84	.167	1.007	10.5	16.6	.028	1.2	.0326	8.1
Weight of shell and corrugations									613.3
Weight of diaphragms									58.3
Rivet heads									15.0
Frames and fittings at wing root and engagements									47.0
Tank ends and petrol system fittings									36.4
Total weight of spar									770 lb.

* Any material may be used, but Duralumin to Spec. L3 has been chosen for the present example.

ESTIMATED WING WEIGHT

Item.	Wt. lb.	Remarks.
Spar	770	Calculated in detail after investigation of structural strength.
Ribs, stringers, etc., .33 lb./sq. ft.	242	In the case of the "Monospar" wing for the Fokker F.VII, this item weighed .26 lb./sq ft. (vide *Aeronautical Journal*, Oct., 1932). This is increased to .33 lb./sq. ft. to cover increased load factor requirements.
Skeleton ailerons, 72 sq. ft.	56	In the case of the "Monospar" ailerons the weight was .51 lb./sq. ft. This has been increased to .76 lb./sq. ft. for the same reason as in the case of the previous item.
Controls in wings..	21	Proportioned from Segrave Meteor.
Fabric and dope, 735 sq. ft. at 0·2 lb./sq. ft.	147	Vide weight analysis of "Monospar" wing for Fokker F.VII.

Total wing weight 1,236 lb.

Wing area	735 sq. ft.
Weight per sq. ft...	1.69 lb.
Wing structural weight	11.3%

Astonishingly low structural weight percentages have been claimed for single spar construction, but these claims mean nothing unless the design conditions are stated at the same time.

The most important of the design conditions are :

Such a design would be desirable for a freight carrying aircraft to transport heavy loads at comparatively slow flying speed. Where high speed is of more importance, a wing of greater aerodynamic efficiency—which must necessarily be heavier—should be used.

Some day a formula may be discovered which takes account of all structural and aerodynamic conditions and produces the right answer to any given specification of requirements.

THE INSTITUTE OF METALS

The 26th annual meeting of the Institute of Metals was held in Manchester from September 3 to September 6. The thirteenth Autumn Lecture was delivered by Dr. J. L. Haughton in the Great Hall of the College of Technology, and dealt with "The Work of Walter Rosenhain." In the morning of September 4 there was a general meeting in the Reynolds Hall, where a civic welcome was given by the Lord Mayor of Manchester. In the afternoon visits were paid to the works of the Broughton Copper Co., Ltd., Metropolitan-Vickers Electrical Co., Ltd., W. T. Glover & Co., Ltd., Mather & Platt, Ltd., and the British Cotton Industry Research Laboratory.

On September 5, at a general meeting in the College of Technology, papers were read and discussed during the morning, and in the afternoon visits were paid to the works of the British Copper Refiners, Ltd., British Insulated Cables, Ltd., Callender's Cable and Construction Co., Ltd., and the Chloride Electrical Storage Co., Ltd. In the evening there was a reception by the University of Manchester.

The last day of the meeting was spent in making excursions by motor coach to Froghall, North Staffordshire, and to Buxton.

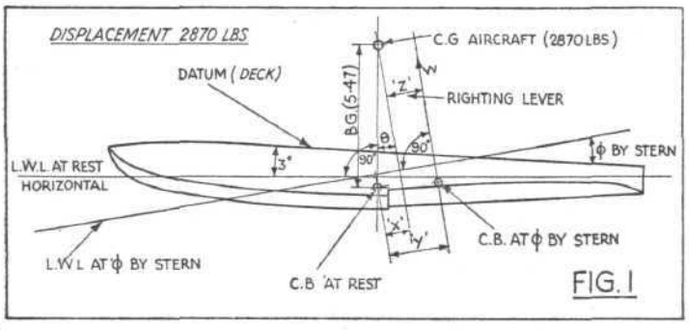
LONGITUDINAL STABILITY CALCULATIONS OF SEAPLANES ON WATER

In a letter which accompanied the article published below, the author points out that when, some time ago, he had to calculate the stability of a pair of floats for a seaplane, he had to evolve the following method. He is, of course, the first to admit that it is much easier to obtain the results with a model in the tank, but when no model is available the following method may be helpful

By H. PARKINSON

SEAPLANE characteristics are readily obtainable when a tank and models are available, but in the absence of the latter, it becomes necessary to investigate the problem by the use of mathematics.

The particular problem which these notes are intended to deal with is that of plotting a figure to show the range of longitudinal stability of the aircraft when at rest on the water. Having found that the metacentric height is suitable, the figure, or " Righting Moment-Trim " curve, may be proceeded with.



At this point it may be well to recall that independent float designs, which are numerically equal to Reserve of Buoyancy, Total Displacement and Metacentric Height, are fairly certain to produce righting moments of different numerical values at the larger angles of trim.

Apart from an artificial increase in righting moments by a corresponding increase in reserve of buoyancy, the optimum values of the moments to cause instability, compatible with other requirements, is a factor requiring attention to the float shape in the early stages of design.

The arithmetic in connection with the work is appreciably laborious, and one has found the graphical method, used herein, to be a satisfactory substitute for the more classical Simpson's Multipliers.

Referring to Fig. 1, it is readily seen that at any angle of trim ϕ, the righting moment is defined by :

$$RM = W.Z.$$

where :

RM = Righting moment.
W = Total displacement to L.W.L.
Z = Righting lever.

The foregoing condition defines the calculations as an investigation into :

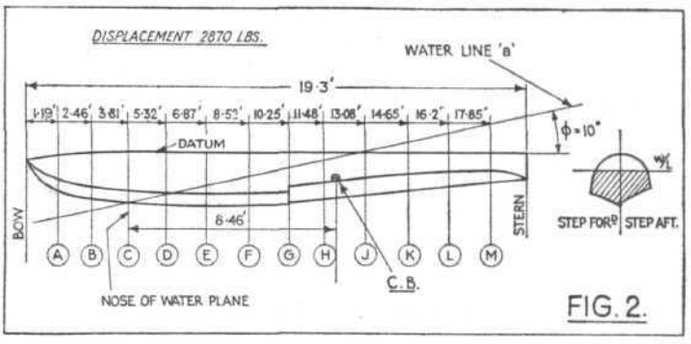
(1) The positions of the centres of buoyancy for several arbitrarily chosen angles of trim over the range of stability.

(2) The righting levers at the chosen angles of trim.

For the first stage, the Lines drawing, Fig. 2, will be necessary.

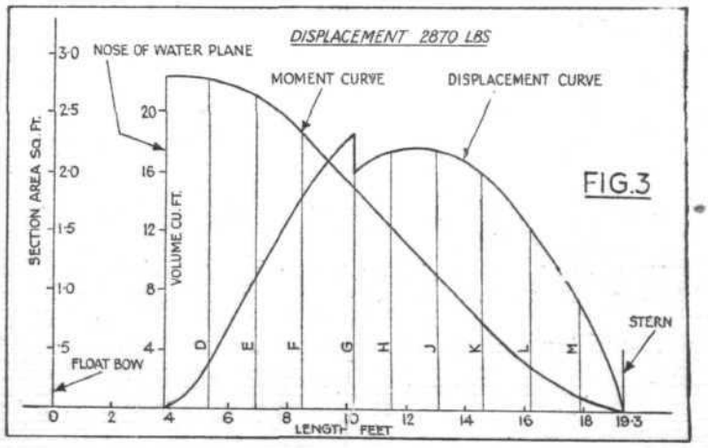
Considering any water line " a " at an angle of ϕ to the datum, the underwater areas at the various transverse sections are tabulated together with the appropriate distance from the Float bow. This information is shown on Table 1. The information is then plotted on Fig. 3 under the title of " Displacement Curve," and the curve is then integrated in order to obtain the displacement to L.W.L. The result is added to Fig. 1, and the necessary calculations computed thereon.

The draft position of the water line is a matter of trial, but an error of about × 2 per cent. in the estimated displacement should be considered satisfactory. In any case, a small error in the calculated displacement will have little effect on the later calculations for the position of the centre of buoyancy. If the L.W.L. is shown on the Lines drawing, it is possible to make a very close estimate of the new water line by inspection.



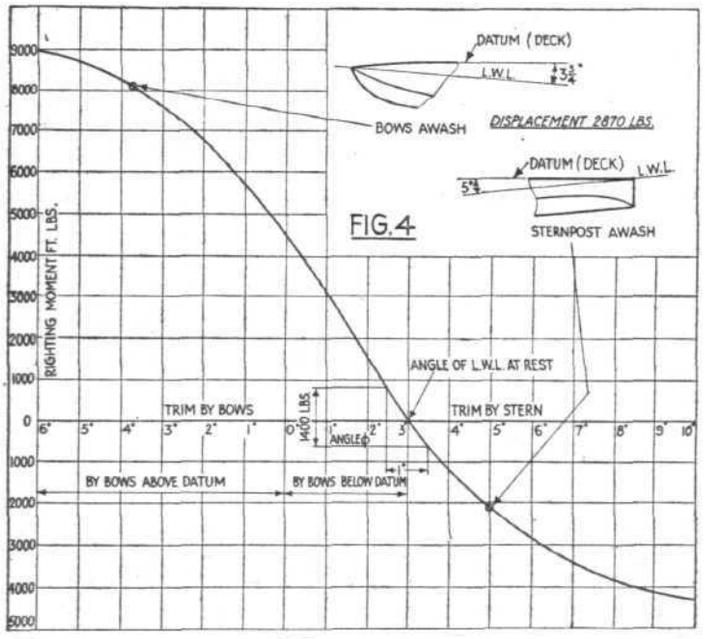
The " Moment Curve " is now required for the purpose of assessing the fore and aft position of the centre of buoyancy. The required data are obtained directly from the Displacement curve in Fig. 3 and is obtained as indicated by the appropriate heading on Table 2. The values shown in Table 2 are plotted on Fig. 3, and the resulting figure described as the " Moment Curve." The " Moment Curve " is then integrated to obtain the total moment of the displacement about the nose of the Water Plane. Following this, the fore and aft position of the centre of buoyancy is calculated as indicated on Table 2. A close approximation of the draft position of the centre of buoyancy may be made by eye.

The centre of buoyancy position may now be drawn on Fig. 1 and the Righting Lever Z scaled directly from the figure. Table 3 clearly indicates all the remaining calculations for obtaining the righting levers and righting moments



The " Righting Moment-Trim " curve shown on Fig. 4, is obtained by plotting the appropriate information from Table 3.

Should a cube law factor be used to modify the linear dimensions of the existing float to suit any other displacement, then the righting moments of the new flotation system follow immediately. In addition to the above, the percentage reserve of buoyancy must be numerically equal for both flotation systems.



$$Z = \frac{RM}{W}$$

$$RM_1 = \triangle \left(Z \sqrt[3]{\frac{\triangle}{W}} \right)$$

$$= \triangle \left(\frac{RM}{W} \sqrt[3]{\frac{\triangle}{W}} \right)$$

$$RM_1 = RM \left(\frac{\triangle}{W} \right)^{4/3}$$

Where :

RM = Known righting moment at W displacement.

RM_1 = Required righting moment at $\triangle$ displacement.

This also assumes that BG varies in the same ratio as the linear dimensions of the float.

The slope of the " Moment Curve " in the region of the " at rest " position, is indicative of the metacentric height. As the slope of the " Moment Curve " is approximately constant for small angles of trim, it will be in order to assume an angle of 1° in the following :

$$RM = W \times Z$$

$$GM = \frac{Z}{\text{Tan } 1^\circ}$$

$$Z = \frac{RM}{W}$$

$$\therefore GM = \frac{RM}{W \text{ tan } 1^\circ}$$

Where GM = metacentric height.

The metacentric height from Fig. 4 is :

$$GM = \frac{1400}{2870 \text{ tan } 1^\circ}$$

$$= 26.5 \text{ feet.}$$

TABLE I

Case :—

Displacement to water line " a."
Trim 10° by stern.

Section	Area to W/L	Distances from Bow, Feet
A	0	1.19
B	0	2.46
C	0	3.81
D	.38	5.32
E	1.09	6.87
F	1.8	8.52
G. For'd.	2.34	10.25
G. Aft	1.99	10.25
H	2.17	11.48
J	2.17	13.08
K	1.98	14.65
L	1.5	16.2
M	.9	17.85
Stern	0	19.3

From Fig. 3 :—

Displacement to water line " a " in cu. ft. = 22.4
Displacement for two floats in cu. ft. = 22.4 × 2 = 44.8
Displacement in lb. = 44.8 × 64 = 2,870 lb.
Sea water at 64 lb. per cu. ft.

TABLE II

Case :—

Centre of buoyancy position. Water line " a."
Trim 10° by stern.

Element	Volume cu. ft.	Distance from Bow, Feet
Stern to M	.89	17.85
" " L	2.9	16.2
" " K	5.73	14.65
" " J	9.0	13.08
" " H	12.4	11.48
" " G	15.02	10.25
" " F	18.6	8.52
" " E	20.98	6.87
" " D	22.2	5.32
Stern to nose of water line	22.4	3.81

From Fig. 3 :

Moment of float about nose of water plane = 23.7 × 8 = 189.6ft.⁴

C.B. aft of nose of water plane $= \frac{189.6}{22.4} = 8.46$ft.

TABLE III

	Trim by Bows				At Rest	Trim by Stern			
Angle θ ...	9°	6°	3°	1½°	0°	1°	3°	5°	7°
Angle ϕ ...	6°	3°	0	1½°	3°	4°	6°	8°	10°
" Y " ft. ...	3.972	3.218	1.854	.955	0	.5	1.271	1.805	2.167
χ 5.47 Sin θ	.852	.568	.284	.143	0	.096	.284	.475	.667
$Z = Y - \chi$	3.12	2.65	1.57	.812	0	.404	.987	1,330	1.500
Righting Moment 2,870 × Z ft. lb. ...	8,940	7,600	4,500	2,330	0	1,160	2,830	3,820	4,300

TO CONTRIBUTORS

Contributors are reminded that articles submitted should, if at all possible, be typewritten, on one side of the paper only. Illustrations, particularly graphs and diagrams, should be clearly drawn, although it is not essential that they are drawn in ink. Pencil diagrams, if neatly drawn, are quite suitable, but they should not, as many of our contributors appear to think, be drawn in among the text. All illustrations should be on separate sheets and clearly numbered. It is also of assistance if an indication is given of where in the text it is desired to place each figure, although it is not always possible to place the illustrations exactly where the author wishes them to be, type metal being somewhat "inelastic."

BOW-STRAIN

From the earliest days, the name T. W. K. Clarke has been associated with the technical aspects of aeronautics, and we welcome this contribution from an "Old Timer"

BY T. W. K. CLARKE, B.A., F.R.Ae.S.

IN connection with the bowing, due to end-load or to any other cause, of a structional member such as a strut, platework, etc., it is sometimes necessary to know the decrement of length due to this bowing.

Whatever type of curve the bent member assumes, the ratio of this change in length to the original length, which may be termed "bow-strain" lies close to $2/3\left(\frac{d}{l}\right)^2$; where d is the maximum bow deflection, and l is half the length of the bowed portion of the member.

The appended table gives the numerical coefficients for various forms of curves; these values are termed bow-strain coefficients.

For example, suppose AB (see diagrams 1 and 2 of the table) represents a straight unstressed flexible wire, fixed to rigid anchorages at its ends A and B. Then, if this wire be stretched, within the elastic limit, by bending to the form ACB, the bow-strain of the curve will be identically the same as the mechanical strain set up in the wire, and if it were multiplied by E, Young's Modulus for the wire, it would give the stress in the wire.

If its length were $2l$ and it were hanging freely with a sag $= d$ it would assume the form of a catenary and have a "Bow-strain" coefficient (see No. 2 in the table) $= \frac{2}{3}$; the stress in it would therefore be $\frac{2}{3}\left(\frac{d}{l}\right)^2.E$

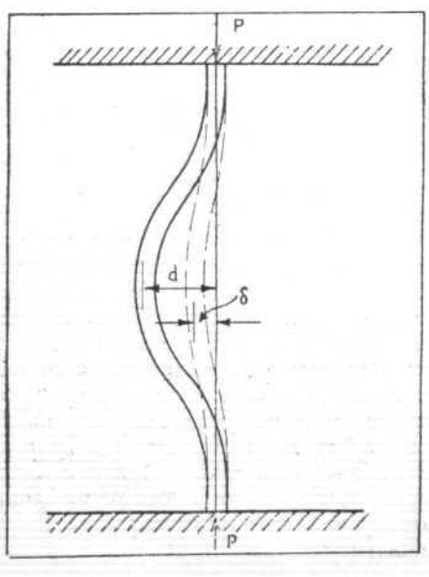
If the anchorages A and B instead of being rigid were elastic, then it is easily seen that we must replace E by E′ where $\frac{1}{E'} = \frac{1}{E} + \frac{e}{l}$ where e is the "approach" of the anchorages A and B per unit stress in the cable.

NOTES ON THE TABLE

The above table applies only to "flat curves," *i.e.*, those in which the fourth and higher powers of the slope at any point, relative to the chord, can be neglected.

In the case of the circular arc, bow-strain = the limiting value of $R(\theta - \sin\theta)/R\sin\theta = \frac{1}{6}\theta^2 = \frac{2}{3}\frac{d^2}{l}$, where 2θ is the angular length of the arc, and R its radius. In general, the bow-strain coefficient is calculated from the formula :—

bow-strain coefficient $= \frac{1}{2l}\int_0^l (\text{slope})^2 dx.$

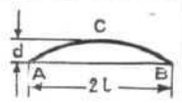
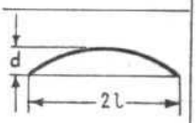
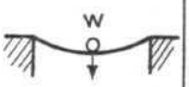
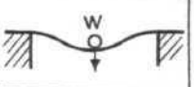
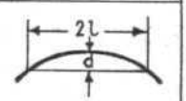
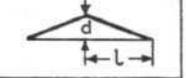
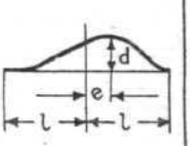


It will be seen that the value of the coefficient ranges from $\frac{1}{2}$ for two straight lines (see No. 11 in the table) to slightly more than $\frac{2}{3}$, as for the case of an elliptic arc (see No. 10) or a curve whose curvature is greater near

TABLE OF BOW STRAIN COEFFICIENTS.

Bow strain $= \frac{\text{Arc length} - \text{chord}}{\text{chord}} = c\left(\frac{d}{l}\right)^2$ for flat curve only

c = bow strain coeff., d = camber and l = half length of chord.

No.	Curve and its Cartesian Co-ordinates.	Bow Strain Coeff. C. Formula.	Bow Strain Coeff. C. Numerical Value approx.	Diagram.
1	Circular arc.	$\frac{2}{3}$	0.667	
2	Catenary or cosh curve $y = a - d - a\cosh\frac{x}{a}$ where $a = \frac{l^2}{2d}$	$\frac{2}{3}$	0.667	
3	Parabolic arc. $d - y = \frac{d}{l^2} \times x^2$	$\frac{2}{3}$	0.667	
4	Sine curve $y = \frac{d}{2}\left(1 + \cos\frac{\pi x}{l}\right)$	$\frac{\pi^2}{16}$	0.616	
5	Half sine curve $y = d\cos\left(\frac{\pi x}{2l}\right)$	$\frac{\pi^2}{16}$	0.616	
6	Supported beam centrally loaded (or end loaded cantilever) $y = d - \frac{d}{2l^3} \times x^2(3l - x)$	$\frac{2}{3}$	0.6	
7	Supported beam uniformly loaded $y = d - \frac{3d}{2l^3}x^2\left(l - \frac{x}{3}\right)$	$\frac{33}{56}$	0.589	
8	Clamped beam centrally loaded. This may be divided into four equal end loaded cantilevers, and is therefore the same as 6.	$\frac{3}{5}$	0.6	
9	Clamped beam uniformly loaded $y = d\left(1 - \frac{x^2}{l^2}\right)^2$	$\frac{64}{105}$	0.61	
10	An elliptic segment of camber $d = k \times$ semi-minor axis. $y^2 = \frac{l^2}{k^2}\left(1 - \frac{x^2}{k^2}\right)$ Refer to its own axis.	$\frac{2}{3} + \frac{1}{15}k$	$0.667 + \frac{0.067}{k}$	
11	Two straight lines.	$\frac{1}{2}$	0.5	
12	An unsymmetrical curve formed of two curves of the same type; if the crown of the complete curve has an eccentricity e. In this case the coefficient is the same as that of each of the curves from which it is formed. But instead of the argument $\frac{d^2}{l^2}$ we shall have $\frac{d^2}{(l^2 - e^2)}$ Thus bow strain $= c\frac{d^2}{(l^2 - e^2)}$			

its ends than in its central portion. *As another example*, let us consider the shortening of a bent strut of length $2l$ under an end-load P.

If the strut is of uniform section, it will, under end load, tend to bend to a sine curve, if "tapered," to a curve intermediate to a sine curve and a circular arc.

In the first case the bow strain coefficient is 0.616, while for a circular arc it is 2/3. An estimate then of say 0.64 will probably be quite near enough for practical purposes.

If the load bends the strut to a known camber d, the shortening of the strut will be expressed by the equation:

$$(\text{bow strain}) \times 2l = 0.64 \left(\frac{d}{l}\right)^2 2l = 1.28 \frac{d^2}{l}$$

If d is not known, but one knows δ the "effective" initial camber*, $d = \frac{Pe}{P_e - P}\delta$ approximately where P_e is the Euler load for the strut. The substitution of this value d in the preceding equation gives the shortening of the strut for any end-load P.

* Approx. = the initial camber + 1.2 × eccentricity of the neutral axis due, for example, to want of uniformity in the thickness of a tubular strut.

TECHNICAL LITERATURE

SUMMARIES OF AERONAUTICAL RESEARCH COMMITTEE REPORTS

These Reports are published by His Majesty's Stationery Office, London, and may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C.2; 120, George Street, Edinburgh: York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square West, Belfast; or through any bookseller.

NOTE ON A METHOD OF REPRESENTING SPAR TESTS. By H. R. Fisher, B.A. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1537. (26 pages and 16 diagrams.) February 2, 1933. Price 1s. 9d. net.

Professor Southwell has put forward a method* of graphical representation in which the points representing the observations fall approximately on a straight line whose slope is a measure of the load corresponding to elastic instability. It is thus possible to obtain an indication of the value of this critical load when elastic failure of the material prevents this load being nearly approached.

A spar, which may have a small initial bowing, is supposed subject simultaneously to end load, which may be applied eccentrically, and to symmetrically distributed lateral loading. Calculations of its behaviour, made on the usual assumptions, are put in a form showing the amount of deviation from linearity of the curve obtained by plotting deflection against deflection/load,* both when the lateral load is constant and when it is kept proportional to end load.

The effect of zero errors in measurements of deflection and end load are considered.

Experimental confirmation of the theory is obtained from tests on a steel bar within the elastic limit, and results are shown of applying the method to tests in which the elastic limit is exceeded.

Below the elastic limit approximations of the Berry type make the method of Reference 1 applicable to spar tests, provided the deflection is appropriately defined. The rough experimental material at present available suggests that it may also be of use beyond the elastic limit.

* E.F.297. "On the analysis of experimental observations in problems of elastic stability." R. V. Southwell. Also *Proc. R. Soc.* (A), Vol. 135, 1932.

EXPERIMENTS ON THE DISTORTION OF A STRIPPED TWO-SPAR METAL WING UNDER TORSIONAL LOADING. By D. Williams, B.Sc., A.M.I.Mech.E., and H. F. Vessey, B.Sc., A.F.R.Ae.S. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1571. (17 pages and 21 diagrams.) April 19, 1933. Price 1s. net.

In some recent work on the elastic deformation of two-spar aeroplane wings under torsional loading, theoretical results have been obtained on the convenient assumption that the ribs connecting the spars are rigid in their own planes and so impose on the spars the same angular displacement as the wing at each point along the span. A subsequent investigation (4) suggests that actual ribs will behave very approximately according to this assumption, and the primary object of the experiments described in Part II of this Report was to discover whether ribs do behave in this manner, and if not, to find the effects of their flexibility. In other words, it was desired to check the accuracy of wing stiffness calculation on the basis of the "rigid rib" assumption, by actual experiment.

Good agreement between theory and experiment was obtained and the basis of the theoretical work above referred to appears to be established.

PART I. MODEL TESTS. By A. V. Stephens, B.A., and J. Cohen, B.A. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1576. (10 pages and 2 diagrams.) July 16, 1932. Price 9d. net.

The Pterodactyl is controlled by large flaps on the wing tips, which function as elevators when moved together and as ailerons when operated differentially. There are also small rudders on either wing tip, so connected that the starboard one only is deflected when the right rudder is applied and vice versa. In the past ailerons and other wing tip controls have been found to be of little value in recovering from spins and it was thought possible that the controls of the Pterodactyl might prove altogether inadequate.

The Pterodactyl exhibits unusual properties in that the ailerons are of paramount importance in establishing or recovering from a spin, whereas the rudders are ineffective. The tests show that rapid recovery from any spin should be obtained provided that the pilot is able to exert sufficient force to set the ailerons fully against the spin, or alternatively to move the control column fully forward. The existing rudders are inadequate and an appreciable improvement can be effected by doubling their area.

SOME CALCULATIONS ON THE STRESSES INDUCED BY GUSTS IN THE FUSELAGE OF A PARTICULAR AEROPLANE. By H. H. Fisher, B.A. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1581. (18 pages and 7 diagrams.) January 31, 1933. Price 1s. net.

It has been suggested that gusts may sometimes give rise to serious stresses in an aeroplane fuselage and this report describes some calculations for a particular aeroplane which have been made with a view to determining the order of the stresses actually likely to occur.

A method similar to that given in R. & M. 1463* has been applied to calculate the behaviour of the aeroplane when flying fully loaded at 116 m.p.h. into a gust perpendicular to the wing-chord whose velocity increases linearly along the flight path. Curves are given showing the history of the forces in various members of the fuselage.

A gust of 30 f.p.s. is not capable in the conditions assumed of adding in any member examined a load of more than 0.23 of its estimated strength. Calculations for other cases, elasticity being considered, would be very unlikely to raise this figure to as much as 0.5. Sudden tail forces due to irregular air motions not amenable to calculation would have their efforts reduced by about 50 per cent. in the front bay of the rear fuselage, because of the inertia of the rear fuselage and tail. Fuselage stresses due to gusts thus appear in general unlikely to be of serious magnitude.

* R. & M. 1463. Acceleration of Aeroplanes in Vertical Air Currents. Part I, by H. R. Fisher.

WIND TUNNEL TESTS ON JUNKER TYPE AILERONS. By F. B. Bradfield, Math. and Nat. Sci. Triposes, and W. E. Wood, B.Sc. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1583. (6 pages and 7 diagrams.) August 26, 1933. Price 6d. net.

Wind tunnel tests have been carried out on ailerons of Junker type, to determine whether this is a suitable type for use when a very high degree of balance is required. The aileron is an independent surface carried below and behind the trailing edge of the wing, giving in effect a slotted flap, but arranged so that the aileron is not shielded behind the main wing. This arrangement gives a larger rolling moment per unit aileron area than the balanced aileron forming part of the wing section. In the following tests the Junker aileron has a chord width of 0.2c to give rolling moments comparable with those of a Frise aileron of the same span and of chord 0.3c.

The Junker type of aileron produces roughly 50 per cent. greater rolling moment per unit aileron area than a Frise balance aileron of normal type, and the moment is less reduced at the stall. The yawing moments for a given rolling moment are somewhat larger on the Junker aileron except at the stall, when they are no worse than for the Frise aileron. The ailerons may be closely balanced.

AN EXPERIMENTAL STUDY OF THE STALLING OF WINGS. Aeronautics Laboratory, Cambridge. R. & M. No. 1588. (21 pages and 12 diagrams.) December 28, 1933. Price 1s. 3d. net.

The problems presented by the flight of aeroplanes near their minimum flying speeds are not yet completely understood. Predictions of behaviour in flight based on wind tunnel experiments have not hitherto been uniformly successful and do not explain why aeroplanes generally similar in design and having the same nominal wing profile may differ widely in the reputations which they acquire for behaviour at low speeds. One cause of these difficulties may lie in variation in the mode of separation of the air stream from the upper* surfaces of the wings as incidence increases. For it is known that this separation may be either sudden or gradual and that sudden separation causes sudden changes in the air reactions, while the mode of separation may depend upon small variations in wing form or surface roughness which may fall within the customary tolerances of full-scale construction.

The experiments were accordingly undertaken to relate observations of turbulence above the surfaces of wings to the air reactions upon them, during the process of stalling.

Measurements of lift, drag and centre of pressure, and of distribution of pressure and total head were made upon a series of wings about which the flow was approximately two-dimensional. These measurements were correlated with observations of turbulence obtained by exploring the field of flow with very small silk threads attached to the points of thin wires.

Observations of turbulence can give a good idea of the character of the force-incidence curve for a portion of a wing as it passes from the unstalled to the completely stalled state, and it is possible to recognise those changes of turbulence which lead to ambiguities and dicontinuities in the curves. The observations throw light on the process of the stall and the nature of scale-effect and suggest that, in certain circumstances, discontinuities which may affect aeroplane manœuvre may not be revealed in the force-incidence curves obtained, either on the model or the full scale, by methods in use at the present time.

* The words "upper" and "lower" will be used with reference to an aeroplane flying in the normal manner.

MAGYAR PILOTA PIC NIC

A Visit to Hungary by British Private Owners

FOURTEEN aeroplanes from England took part in the first International touring flight arranged by the Magyar Touring Club in conjunction with the Royal Aero Club and the Automobile Association. From all accounts it appears to have been one of the best parties of its kind ever organised, and the thanks of all those who took part are readily extended to the President of the Touring Club, Doctor Julius v. Vermes, together with all those other officials who did so much to look after their visitors. The machines arrived in Buda Pest on Saturday, September 15; the following day they flew to Miskolcz, and later saw some wonderful examples of embroidery and many peasants in their national dress at Mezőkövesd. During the rest of the week a very varied programme was arranged for them. They saw not only the wild country of Hungary but also a great deal of the night life of Buda Pest and other cities. When they arrived on Saturday afternoon, the majority of them having been through very bad weather on their journey from England, they were welcomed by a large concourse of people and high officials, led by Archduke Albrecht, the patron of the "Pic Nic." Some idea of the pleasures they had in Hungary can be gained from the following letter we have received. Among the well-known English pilots were E. H. Thierry, H. Petre, G. Ogilvie, O. Atkey, L. Lipton, W. Hey, G. Garnett, R. Presland, C. Napier, S. Turner, M. Creswell, R. Leckie, and last, but by no means least, Miss C. Leathart, who was the only lady pilot who took part, and whom, as may well be imagined, received a great ovation and many flowers when she arrived at the Mátyásföld Aerodrome of Budapest.

"Friday—Vienna—Sunset at Aspern. The few British who have arrived have ordered *tea*, and Major Petre looks round sadly and ticks off the littlest one [Miss Leathart's "Swift."—ED.] on his rather formidable list. He is at present in charge of the party, as Crammond has not arrived. One by one red lights appear on boundaries and wireless masts, the buzzer moans as a late machine lands and taxies in. Someone says: "Isn't this VW.?" and Lipton joins the party round the table.

Saturday.—Next morning there is a telegram from Crammond saying he is stuck at Hanover. This causes comment, as it is hardly on the way to Vienna, but no one else has sent any message at all! Most of them left about the same time as we did by various routes, so they are presumably littered about Europe.

WHEN IN ROME . . .? (Left to right) Miss Ibranye Alice, in national dress, also worn for the occasion by three of the English visitors, Capt. Ramsden, Mr. G. W. Harben and Miss Mollie Olney.

ON MATYASFOLD AERODROME: (Left to right) Consul E. Kirchknopf, general secretary of the Magyar Touring Club; Dr. Georg v. Rakosy, Director of Aviation; Archduke Albrecht, Patron of the Touring Club; Dr. Julius v. Vermes, President of the Touring Club: and Heinrich Szentkeresztessy, an aviation official.

Meantime Count Zichy has arrived to meet us and head the formation flight to Buda Pest. From him we learn that his Royal Highness the Archduke Albrecht of Hapsburg is waiting at Mátyásföld, and something has to be done. Lipton does it by pushing off while the rest of us are talking, and so earns the distinction of being the only visitor to arrive in time. Miss Leathart arrives next, and, as females don't fly much in Hungary, the "Swift" is well mobbed. A bouquet is thrust into the cockpit, causing confusion with the Sutton harness, and it is some time before the pilot can be extracted and led through the maze of air traffic officers, reporters, photographers and Shell men to where the Archduke is waiting. Almost at once the Professor hustles her away—the "Swift" must be moved so that Petre and Robertson in the "Puss Moth" can taxi up to the reception. Dr. Thierry and Mr. Hall are now on their way, ticket books have to be given out and money changed, so that lunch is about 4 o'clock. People are drifting in all the afternoon, the Heys from the prohibited area round Nancy and the B2 has not missed a single aerodrome! Those who have arrived go off to bathe, and we all meet for tea at the Magyar Athletic Club on the Margaret Island. We are welcomed by Dr. Vermes, the President, and introduced to the members and the excellent Hungarian habit of having rum in one's tea.

Dinner at the Hungaria, where we are all staying, and go out to see the night life and the magnificent sight of the city lights from the hill of old Buda.

Sunday.—Exhorted by the Professor, lined up by the Colonel, and flagged off by George, we fly to Mezőkövesd and a natural aerodrome where no aeroplane has yet landed. Men, women and children in peasant dress sit in carts or stand along the road. Some climb trees for a better view of us. An extraordinarily well-behaved crowd who have never seen an aeroplane on the ground before, who look but don't touch. We blush for our civilisation as we hurtle along in our 'bus forcing them to eat our dust.

The Matyo's house is half museum, half café. We bought things and had a good lunch while the Matyos cooked their

ARRIVING AT BUDAPEST: Major H. Petre (striped suit) being greeted by the Archduke Albrecht. Miss Constance Leathart, with the flowers, was the only lady pilot to take part in the Pic Nic.

sausage over an open fire and danced the Czardas to the gipsy music. Harben and Miss Olney dressed up, and most of us danced too. Afterwards the idea was for us to see the people go into church in their beautiful Sunday clothes, and the Professor had us lined up in good time on a convenient pavement. As time went on we remarked that all the people seemed very old and comparatively few. Then a young priest came out and told us the reason—all the young ones had gone to dance at a grape feast. With true Christian forbearance he showed us the way to the counter-attraction. Miskolcz, where we arrived about 4 o'clock, is a manufacturing town of 60,000 inhabitants. Its streets are wide and clean, and surrounded by red-roofed cottages standing in their own gardens. In Hungary one has this feeling of grace and space, and there are more flowers than one remembers seeing in other countries. As we drove through a village on the way to Lillafüred we saw a grape harvest festival—men dressed up on horses and one with a black face chasing the children.

Lillafüred Hotel stands high in the neck of a valley. Limestone cliffs rise on each side, a lake above, waterfall through the garden, and stalactite caves beneath.

Mr. and Mrs. Pears came up from the British Legation, and we dined and danced and even bathed at midnight. The Hungarians said it was much too cold, but to English standards the water was tepid.

Monday.—The Horto Bagy was what many of us had come to see, and we were certainly not disappointed. This is the real Hungary, a vast plain on which one can land anywhere, good hard pasture, though there are swamps in places where later flighting geese come in their thousands. Here the State keeps cattle and horses for breeding purposes. We saw about sixty brood mares of much more Western characteristics than most of the horses one sees about. We heard this strain has descended from a horse left by Napoleon. The Professor next turned to the cattle, which he said were stallions, and on being remonstrated with altered the name to bullions! The weather was perfect, and the mirage of Fata Morgana doing its stuff all round us.

There is a lovely clean little inn where you can stay for five pengoes a day, but no one does, except for the goose season. Here we had goulash with gipsy music, and danced the Czardas afterwards. Then we were driven back to the aeroplanes and seen off by the Csikós on their horses. The sun was sinking rapidly, and we felt we should never reach the baths. We did though, and it was a remarkable experience—about twenty of us sitting about talking in hot water up to the neck in the open air, evening sun slanting through the trees, Lipton feeling the spout with his toe and getting burned, a splashing match in mid-ocean, then the race through the gardens to the cold pool and a final plunge. Then those who had not already viewed the crematorium were driven to it (it is not used, by the way, as it is against the law in Hungary), and we finished a somewhat physiological afternoon in the mummy house of the Deri Museum. None of us had ever had tea in a museum before, but apparently they don't do it every day. Before dinner we had some marvellous Tokay like very light dry sherry.

Tuesday.—Back to Buda Pest, with more bouquets, the problems of getting rid of decaying vegetation getting acute. But first Presland wants his compass swung, and everyone gathered round to give advice, a sort of cross between the League of Nations and the Tower of Babel. So it's not very surprising that he is heard asking for it to be done again at Mátyásföld.

In the afternoon those who wanted to sightsee, sightsaw. Others shopped and bathed. At the St. Gelert are the artificial waves which Robertson has been talking about ever since he left England. Mr. and Mrs. Houston-Boswell and Mr. and Mrs. Pears nobly devoted the evening to taking us round the night clubs, and we found the Hungarian champagne as good as anything we have had."

(To be concluded.)

AIRCRAFT TO THE RESCUE

The advantages of employing aircraft in surveying flooded areas is indicated by a recent aerial survey carried out in India, when the executive engineer was able, within a few hours, to give prompt instructions, whereas—even had it been possible to go by land—the work would have taken days.

Torrential mountain streams in Western Sind are the inevitable result of heavy rainfall in the Kirthar Range of mountains, and they then bring forth heavy floods. An embankment, called the flood protection bund, is being built on the right bank of the Indus in order to protect the irrigated area from floods. Further, at a point where Gaj Nai, the biggest hill stream, comes out, diversion works are under construction. All of which is being done to change the regular flow of the stream from east to south, so that it may find its way to the great Manchar Lake—the biggest lake in Sind.

The engineer in charge of these works, Mr. H. P. Mathrani, was in Karachi when he received an urgent message that the hill floods, which usually occur at the end of July, had come this year a month earlier. Not only were they likely to do considerable damage to the protective works under construction, but also to cause great havoc in the adjoining area.

To go by land, all the way from Karachi into the hinterland of Sind, would have taken a considerable time, as the floods had rendered the roads to the affected area impassable, and also because the area was so scattered that the extent of the floods could not be accurately gauged travelling by land.

Therefore an aeroplane was hired from the Karachi Aero Club, and, piloted by Mr. Gadgil, Mr. Mathrani flew to the affected area. After an intermediate landing—not without some difficulty owing to the water-logged condition of areas where they wished to land—for engine adjustment, they arrived over the Gaj diversion works. A thorough inspection of the whole area was made, and Mr. Mathrani was able to issue the necessary instructions within a few hours, which, by normal overland operations, would have taken several days.

On several previous occasions similar use was made of aircraft, with excellent results—on one occasion a complete survey of the Indus river and the countryside on both banks being made by officials of the P.W.D. and engineering departments of Sind. There is no doubt that—as in the case of forestry survey and patrol—aircraft can be put to good use in this class of work.

ENGLAND—AUSTRALIA

Further News of Competitors and Their Machines

AS stated in *Flight* last week, the K.L.M. Douglas *will* participate. This will be the only machine of the four original K.L.M. entries to fly the course. It was K.L.M.'s intention to enter the Handicap race with the Fokker F.XXXVI, which was to carry passengers, and to take part in the Speed Race with the Douglas, carrying a special load of mail. The F.XXXVI, however, was not delivered in time for the K.L.M. pilots to get enough experience to fly such a large aeroplane in the race. It is not the intention of K.L.M. to strain after winning a prize. The race has been entered with a commercial purpose in view—to create interest in future air traffic development and to demonstrate in how short a time passengers may be transported from Europe to Australia, in this the latest addition to the K.L.M. fleet. At first it was intended to prepare the Douglas for the Speed Race by fitting extra fuel tanks and making equipment as light as possible. But as only one K.L.M. machine will fly it was decided to keep the aircraft in its standard condition. Three passengers will be carried, one, a Dutch banker, having travelled from Rio de Janeiro to make the flight. The crew will consist of K. D Parmentier (captain), J. J. Moll (second pilot), Prins (flying engineer) and Van Brugge (wireless operator).

K.L.M. does not expect the machine to win the race. The Douglas should arrive in Melbourne on, or before, October 29. It will leave Melbourne on November 7, is expected in the Netherlands Indies on November 9, and will start from Batavia on November 11.

The postal authorities in Holland, and the Netherlands Indies have agreed to have mail carried by the Douglas from Europe to the Indies and Australia, and also from the Netherlands Indies to Australia.

At Hanworth, Flt. Lt. G. Shaw's British Klemm "Eagle" (D.H. "Gipsy Major") has been completed, and is now flying. In addition to the standard two 20-gallon tanks, a third tank, with a capacity of 32 gallons, has been installed in the cabin in place of the rear seats. The filler cap projects through the cabin window. A spare Fairey metal airscrew will be carried, during the race, within the fuselage. Painted on each side of the cowling is the following inscription: "The Spirit of W. Shaw and Co., Ltd., Wellington Cast Steel Foundry, Middlesbrough, England." Apart from one or two extra instruments, such as drift indicator and turn and bank indicator, the machine is a standard fixed-wing "Eagle." The range should be in the region of 1,000 miles.

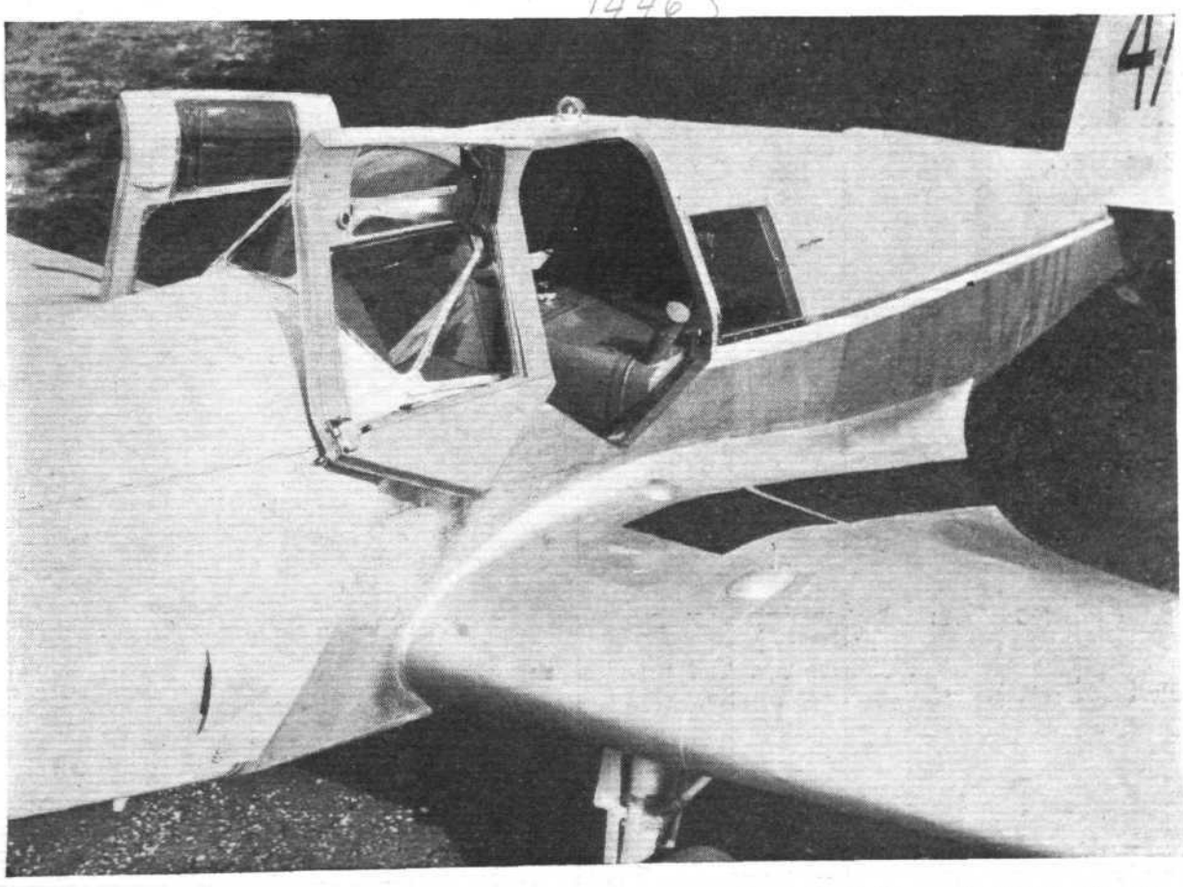
In the shops of the National Flying Services are two Fairey "Foxes," one entered by the New Guinea Centenary Flight Syndicate, which is to be flown by Mr. R. J. P. Parer, and the other, nominated by Mr. J. K. C. Baines, to be flown by F/O. H. D. Gilman. The N.F.S. staff has been working very hard indeed on Mr. Parer's "Fox," which is now almost in racing trim, but is waiting for an auxiliary tank. There will be one or two other minor modifications of which we hope to say more later. It seems rather doubtful if the other "Fox" will compete.

Sir Charles Kingsford Smith

Messages from Melbourne say that Sir Charles Kingsford Smith has stated that, if he does not get the necessary Certificate of Airworthiness for his Lockheed "Altair" within a week from September 21, he will withdraw from the race. The Lockheed Aircraft Corporation had informed Sir Charles that they had forwarded the specifications of the "Altair" to the American Department of Commerce, and that the reply should have been received in Australia. Apparently "Smithy" has received an offer from the Department of Defence to issue to him a C. of A. in a special racing category, sufficient for a flight to England, but not for participation in the MacRobertson race. This was regarded as useless.

Sir Charles has sent a cable to Mustapha Kemal Pasha, asking for permission to fly over Turkish territory during the race. He states that he is unaware of the reason for the ban on crossing this territory, but sincerely apologises if he has given unwitting offence.

(Continued on p. 1008.)



FOR THE HANDICAP RACE: The British Klemm "Eagle" ("Gipsy Major"), to be flown by Flt. Lt. G. Shaw, has been fitted with extra petrol tanks, bringing the total capacity up to 70 gallons. (*Flight* Photo.)

THE ENGLAND-AUSTRALIA RACE

This table of data has been compiled, by courtesy of the Royal Aero Club, from official documents, and from information which "Flight" has collected from various sources. It contains a great .deal of information not hitherto published, and although last-minute changes may be made by some of the competitors, particularly in such items as tankage and equipment, the data given will, in most cases, be found to be reliable.

It is unlikely that all the machines shown in the table will be taking part in the race. Some are already known to be non-starters, but as the Royal Aero Club has had no official notification of their withdrawal, they have been included.

Racing No.	Nationality.	Race(s).	Nominator(s).	Pilot(s).	Aircraft.	All up Weight.	Tare Weight.	Fuel Capacity.	Oil Capacity.	Span.	Wing Area.	Engines.	Type of Engine.	Air or Water-cooled.	No. and Arrangement of Cylinders.	Power.	Pay Load for Race.	Registration.
						lb.	lb.	galls.	galls.	ft. in.	sq. ft.						lb.	
1	G.	H.	Wolf Hirth ...	Wolf Hirth and Hermann Illg.	B.F.W. M.E.-108 (M.).	2,580	1,320	63.3	2.5	33 9½	143	1	Hirth H.M.8a ...	A.	8 inv. V.	230 h.p. at 3,000 ft.	735	D-ILIT.
2	N.Z.	H.	Manawatu Aero Club	Capt. Malcolm McGregor.	Miles Hawk Major M2F. (M.)	1,900	1,111	52	3	33 0	169.5	1	D.H. Gipsy Major...	A.	4 inv. I.L.	120 h.p.	—	G-ACXU.
3	G.B.	H.	Lord Nuffield ...	G. E. Lowdell ...	Airspeed Envoy A.S.6 (M.)	5,300	3,275	170	24.6	52 4	290	2	Wolseley A.R.9 ...	A.	9 rad.	185 h.p.	747	—
4	U.S.A.	S. & H.	Harold Gatty ...	J. Frye and H. Hull	Douglas D.C.2 (M.)	—	12,000	—	—	85 0	940	2	Wright Cyclone SGR-1820-F3	A.	9 rad.	715 h.p.	—	—
5	U.S.A.	S.	Col. Roscoe Turner	Col. Roscoe Turner	Boeing 247-D Transport (M.).	—	—	—	—	74 0	836	2	Pratt & Whitney Wasp S1H1-G.	A.	9 rad.	550 h.p.	—	NC.
6	H.	S.	Dutch Syndicate ...	D. L. Astes and G. J. Geysendorfer	Pander S.4 (M.) ...	—	—	—	—	54 5	—	3	Wright Whirlwind R-975 E2.	A.	9 rad.	420 h.p. at sea level	—	PH-OST.
7	D.	H.	Lieut. M. Hansen ...	Lieut. M. Hansen ...	Desoutter Mark II (M)	2,000	1,255	50	2½	35 9	185	1	D.H. Gipsy III ...	A.	4 inv. I.L.	105 h.p.	445	OY-DOD.
8	H.	H.	K.L.M.	I. W. Smirnoff or G. M. H. Frijns.	Fokker F.XXXVI (M.).	35,200	23,760	748	48.4	107 6	1,850	4	Wright Cyclone SGR-1820-F2	A.	9 rad.	710 h.p. at 3,000 ft.	4,580	PH-AJA.
9	U.S.A.	S. & H.	Keith Rider ...	J. E. Granger ...	Keith Rider R-3 (M.)	3,000	1,500	152½	16.6	25 6	185	1	Pratt & Whitney Wasp Junior. SB.	A.	9 rad.	375 h.p. at 7,500 ft.	—	NC-14215.
11	U.S.A.	S. & H.	Walter T. Varney ...	Capt. F. Rose ...	Lockheed Orion (M.)	—	—	—	—	42 10	294	1	Pratt & Whitney Wasp R-1340 SC1	A.	9 rad.	450 h.p. at 6,000 ft.	—	—
12	F.	S.	Vicomte Jacques De Sibour.	Vicomte Jacques De Sibour.	Couzinet 150 (M.) ...	—	—	—	—	—	—	1	Hispano-Suiza 9V...	A	9 rad.	575 h.p. at 6,230 ft.	—	F-ANEX.
13	F.	S. & H.	Capt. Edouard Corniglion-Molinier	Capt. E. Corniglion-Molinier and Capt. L. Challe.	Wibault 366 (M.) ...	7,352	4,627	300	20	55 8	342	1	Hispano-Suiza 12 Ybrs.	W.	12 V.	759 h.p. at sea level.	1,510	F-ANEN.
14	G.B.	H.	Aircraft Exchange & Mart, Ltd.	A. L. T. Naish ...	Airspeed Courier A.S.5 (M.).	4,100	2,340	129	10	47 0	250	1	Siddeley Cheetah V	A.	7 rad.	270 h.p. at sea level	600	G-ACJL.
15	G.B.	S. & H.	F/O. C. G. Davies ...	F/O. C. G. Davies ...	Fairey III F. (B.)...	5,900	3,890	187	15½	45 9	438.5	1	Napier Lion XIa (Civil).	W.	12 B.A.	530 h.p. at sea level	425	G-AABY
16	A.	H.	Mrs. Melrose ...	C. J. Melrose ...	D.H. Leopard Moth (M.)	2,200	1,400	70	4	37 6	206	1	D.H. Gipsy Major...	A.	4 inv. I.L.	120 h.p.	300	—
18	F.	S. & H.	M. Freton	M. Freton & D'Estailleur Chanteraine.	Potez 39 (M.) ...	7,937	3,968	238	—	52 6	376.7	1	Lorraine Petrel 12 Hars.	W.	12 V.	600 h.p. at 3,500 ft.	—	—
19	G.B.	S. & H.	Bernard Rubin ...	Bernard Rubin and K. Waller.	D.H. Comet (M.) ...	5,320	2,840	260	14	44 0	188.5	2	D.H. Gipsy Six R ...	A.	6 inv. I.L.	225 h.p. at sea level	400	G-ACSR.
20	U.S.A.	S.	Wiley Post ...	Wiley Post	Lockheed Vega (M.)	—	—	—	—	41 0	275	1	Pratt & Whitney Wasp C.	A.	9 rad.	350 h.p. at 36,000 ft.	—	—
21	U.S.A.	H.	Salvador Farre ...	Salvador Farre ...	Percival Gull (M.)...	2,450	1,425	95	6.5	36 2	169	1	Napier Javelin III...	A.	6 inv. I.L.	164 h.p. at sea level	—	—
22	S.	S. & H.	Lieut. M. Lindholm	Lieut. M. Lindholm and G. Lindow.	Northrop Delta (M.)	7,350	4,200	266	16	47 9	363	1	Pratt & Whitney Hornet SD.	A.	9 rad.	700 h.p. at 6,000 ft.	—	SE-ADI.
23	H.	H.	K.L.M.	I. W. Smirnoff or G. M. H. Frijns.	Fokker F.XXII (M.)	28,050	18,300	594	47.5	91 6	1,400	4	Pratt & Whitney Wasp T1D1.	A.	9 rad.	525 h.p. at sea level	3 385	PH-AJP or Q or R.
26	G.B.	H.	Sir Alan J. Cobham	Sqd. Ldr. D. E. Stodart.	Airspeed Courier A.S.5a. (M.)	4,000	2,340	151	13	47 0	250	1	Siddeley Cheetah V	A.	7 rad.	277 h.p. at sea level	—	G-ACVF.
27	Ind.	H.	V. L. Chandi ...	A. M. Morad ...	D.H. Fox Moth (B.)	2,000	1,150	50	2½	30 10½	247	1	D.H. Gipsy Major...	A.	4 inv. I.L.	120 h.p.	450	VT-AEJ.
28	A.	S. & H.	Sir Charles Kingsford Smith.	Sir C. Kingsford Smith and P. G. Taylor.	Lockheed Altair 8c (M.)	6,300	3,297	350	15	42 9¼	265	1	Pratt & Whitney Wasp S1D1.	A.	9 rad.	550 h.p. at 5,000 ft.	—	—
29	I.F.S.	S. & H.	Hospitals Trust, Ltd.	Col. J. C. Fitzmaurice	Bellanca 28/10 902 (M.)	—	—	—	—	—	280	1	Pratt & Whitney Twin Wasp Junr. SAG.	A.	14 rad.	700 h.p. at 10,000 ft.	—	EI-AAZ.

Racing No.	Nationality.	Race(s).	Nominator(s).	Pilot(s).	Aircraft.	All up Weight.	Tare Weight.	Fuel Capacity.	Oil Capacity.	Span.	Wing Area.	Engines.	Type of Engine.	Air or Water-cooled.	No. and Arrangement of Cylinders.	Power.	Pay Load for Race.	Registration.
						lb.	lb.	galls.	galls.	ft. in.	sq. ft.						lb.	
30	U.S.A.	S. & H.	Miss Jacqueline Cochran.	Miss J. Cochran, Wesley Smith, and Royal Leonard.	Northrop 2 P.L.C.M. (M.).	7,800	4,175	400	25	48 0	363	1	Curtiss Super Conqueror SGD-157OF-4S.	W.	12 V.	750 h.p. at 12,000 ft.	500	NC-13761.
31	G.B.	H.	H. L. Brook ...	H. L. Brook ...	Miles Falcon M3 (M.)	2,000	1,270	44	3	35 0	282	1	D.H. Gipsy Major...	A.	4 inv. I.L.	120 h.p.	600	—
32	U.S.A.	S. & H.	Lyon Flight Expedition Co. Inc.	R. F. Lape and H. Lyon.	Lockheed Orion (M.)	7,750	3,600	500	25	42 10	262	1	Pratt & Whitney Wasp S1D1.	A.	9 rad.	550 h.p. at 5,000 ft.	—	NR-14209.
33	U.S.A.	H.	John H. Wright ...	John H. Wright ...	Monocoupe 145 (M.)	1,690	1,005	44.2	4.17	23 2	100.8	1	Warner Super Scarab 40.	A.	7 rad.	145 h.p. at sea level.	—	NC-501 W.
34	G.B.	S. & H.	A. O. Edwards ...	C. W. A. Scott and T. Campbell Black.	D.H. Comet (M.) ...	5,320	2,840	260	14	44 0	188.5	2	D.H. Gipsy Six R....	A.	6 inv. I.L.	225 h.p. at sea level.	400	G-ACSS.
35	N.G.	S. & H.	New Guinea Centenary Flight Synd.	R. Parer and G. E. Hemsworth	Fairey Fox Mk.I (B.)	4,300	2,600	150	6	38 0	366.6	1	Fairey Felix (D.12)	W.	12 V.	450 h.p.	—	—
36	A.	S. & H.	H. C. Miller ...	H. C. Miller and J. Woods.	Lockheed Vega (M.)	4,750	2,490	170	14	41 0	275	1	Pratt & Whitney Wasp C.	A.	9 rad.	450 h.p. at 6,000 ft.	500	G-ABGK.
37	U.S.A.	H.	Paul W. Clough ...	Paul W. Clough ...	Cessna A.W. (M.) ...	2,260	1,297	45	3½	40 4	224	1	Warner Scarab ...	A.	7 rad.	125 h.p. at sea level.	479	NC-7107.
38	N.Z.	H.	R. C. Wallace ...	S. S. Kirsten ...	Short Scion (M.) ...	2,850	1,700	64	5	42 0	255.5	2	Pobjoy Niagara ...	A.	7 rad.	75 h.p. at sea level	—	—
39	F.	S. & H.	Andre De Roussy de Sales and Jean Lacombe.	A. De Roussy de Sales and J. Lacombe.	Bernard 84 (M.) ...	16,093	8,598	—	—	—	—	1	Gnome-Rhone Mistral Major K14.	A.	14 rad.	815 h.p.	—	—
42	H.	H.	K.L.M.	I. W. Smirnoff or G. M. H. Frijns.	Fokker XVIII (M.)	—	—	—	—	80 10	904	3	Pratt & Whitney Wasp.	A.	9 rad.	450 h.p.	—	—
43	A.	S. & H.	Air Race Australian Entry, Ltd.	D. Saville	Harkness and Hillier (M.).	2,780	1,520	140	8	32 0	145	2	Hermes IV ...	—	—	120 h.p.	—	—
44	H.	S. & H.	K.L.M.	K. D. Parmentier and J. J. Moll.	Douglas D.C.2. (M.)	12,000	—	—	—	85 0	940	2	Wright Cyclone SGR-1820-F3.	A.	9 rad.	715 h.p.	—	PH-AJU.
45	U.S.A.	H.	Murray B. Dilley, Junr.	Murray B. Dilley, Junr.	Vance Viking 1a (M.)	10,000	4,900	1,176	76	55 0	490	1	Pratt & Whitney Wasp R-1340 E.	A.	9 rad.	400 h.p. at 9,000 ft.	—	NR-12700.
46	U.S.A.	S.	Clyde E. Pangborn	Clyde E. Pangborn...	Granville Bros. (M.)	—	—	—	—	—	—	1	Pratt & Whitney Hornet T1D1-G.	A.	9 rad.	525 h.p. at 7,000 ft.	—	—
47	G.B.	H.	Flt. Lt. G. Shaw ...	Flt. Lt. G. Shaw ...	British Klemm Eagle (M.)	2,300	1,320	70	7	39 3	200	1	D.H. Gipsy Major...	A.	4 inv. I.L.	120 h.p.	300	G-ACVU.
48	U.S.A.	S. & H	Russell A. Hosler ..	Russell A. Hosler ...	Hosler B (M.) ...	—	—	—	—	—	225	1	Curtiss D.12 ...	W.	12 V.	475 h.p. at 12,000 ft.	—	NR-14 Y.
49	U.S.A.	H.	Miss Ruth R. Nichols	Miss Ruth R. Nichols	Lockheed Altair (M.)	6,500	3,297	400	50	42 9½	294.1	1	Pratt & Whitney Wasp S1D1.	A.	9 rad.	450 h.p. at 6,000 ft.	—	NC-13 W.
50	U.S.A.	S.	New York, London, Moscow, Air Lines.	Lt. Col. G. R. Hutchinson.	Vultee V-1a (M.) ...	—	—	—	—	50 0	384	1	Wright Cyclone SR-1820-F3.	A.	9 rad.	710 h.p. at 7,000 ft.	—	NR-13770.
51	I.	S. & H.	Societa Idrovolanti Alta Italia "Savoia."	Adriano Bacula and Alessandro Passaleva.	Savoia-Marchetti S-79 (M.).	24,300	11,000	1,420	80	69 6	645	3	Piaggio Stella IX RC.	A.	9 rad.	560 h.p. at 13,000 ft.	1,200	I-MAGL.
52	G.B.	H.	R. K. Dundas, Ltd.	Mrs. Keith Miller ...	Airspeed Courier A.S.5a.	4,000	2,340	151	13	47 0	250	1	Siddeley Cheetah V	A.	7 rad.	277 h.p. at sea level.	—	—
53	U.S.A.	S.	Miss Laura Ingalls...	Miss Laura Ingalls ...	Lockheed Orion (M.)	—	—	—	—	42 9¾	262	1	Pratt & Whitney Wasp S1D1	A.	9 rad.	550 h.p. at 5,000 ft.	—	MR-14222.
54	F.	S. & H.	Bleriot Aeronautique Societe Anonyme.	Charles Quatremare...	Bleriot III (M.) ...	7,500	4,300	353	12	55 11	376.7	1	Gnome-Rhone Mistral Major 14. Krs.	A.	14 rad.	810 h.p. at sea level	—	—
55	N.Z.	H.	Messrs. Waugh and Everson.	— Everson	Waugh and Everson (M.).	1,240	700	30	6	34 8	215	1	Bristol Cherub III...	A.	2 H.O.	34.5 h.p. at sea level	250	—
56	G.B.	H.	Lady Cobham ...	Flt. Lt. H. C. Johnson and Flt. Lt. G.A.V. Tyson.	Airspeed Envoy A.S.6 (M.).	5,300	3,275	170	—	52 4	299	2	Wolseley A.R.9 ...	A.	9 rad.	185 h.p. at sea level	—	—
57	U.S.A.	S.	Mrs. Louise Thaden	Capt. Frank Hawks and Major H. Thaden.	Beechcraft A.17.F (B.)	—	—	—	—	34 4	323	1	Wright Cyclone R-1820-F3.	A.	9 rad.	715 h.p. at 6,900 ft.	—	NR-12569.
58	G.B.	S. & H.	Capt. T. Neville Stack.	Capt. T. Neville Stack and S. L. Turner.	Airspeed A.S.8 (M.)	6,400	3,862	270	20½	52 4	294	2	Siddeley Cheetah V1	A.	7 rad.	290 h.p. at 6,000 ft.	400	G-ACMU.
60	N.Z.	S. & H.	Oliver Nicholson, Pres. and Members of N.Z. Centenary Air Race Comm.	J. D. Hewett and C. E. Kay.	D.H. Dragon Six (B.)	5,500	3,360	240	24	48 0	340	2	D.H. Gipsy Six ...	A.	6 inv. I.L.	205 h.p. at sea level	—	ZK-ACO
61	I.	S. & H.	Francis Lombardi ...	Francis Lombardi and Vittorio Suster.	Bergamaschi P.L.3 (M.).	7,500	3,550	441	22	39 6	258	1	Fiat A.59	A.	9 rad.	675 h.p. at 6,000 ft.	500	—
62	G.B.	S. & H.	J. K. C. Baines ...	F/O. H. D. Gilman...	Fairey Fox Mk.1 (B.)	4,200	2,609	150	6	38 0	366.6	1	Fairey Felix (D.12)	W.	12 V.	430 h.p. at 2,500 ft.	—	—
63	G.B.	S. & H.	J. A. Mollison ...	J. A. and Mrs. Mollison	D.H. Comet (M.) ...	5,320	2,840	260	14	44 0	188.5	2	D.H. Gipsy Six R...	A.	6 inv. I.L.	225 h.p. at sea level	—	G-ACSP.
64	A.	S. & H.	H. W. G. Penny ...	H. W. G. Penny and G. Pond.	Vultee V-1 (M.) ...	7,250	4,275	192	30	48 0	361½	1	Wright Cyclone F2	A.	9 rad.	710 h.p. at 3,000 ft.	—	—

ABBREVIATIONS: In the column headed "Nationality," A=Australia; D=Denmark; F=France; G.B.=Great Britain; H=Holland; I=Italy; I.F.S.=Irish Free State; Ind.=India; N.G=New Guinea; N.Z.=New Zealand; U.S.A.=United States of America.

In the third column, S=Speed Race and H=Handicap Race. In the Aircraft column the letters after the type indicate M=Monoplane; B=Biplane.

Abbreviations in the column dealing with arrangement of engine cylinders are: Inv.=Inverted; I.L.=In Line; B.A.="Broad Arrow."; Rad.=Radial; H.O.=Horizontally Opposed.

The Boeing

The Pratt and Whitney Aircraft Co. informs us that Col. Roscoe Turner's machine will be a Boeing 247-D Transport, powered with two Pratt and Whitney "Wasp" S1H1-G engines driving Hamilton Standard three-bladed controllable pitch airscrews. The 247-D is the latest model of the Boeing Transport, which was described in *Flight* of June 15, 1933, and represents the type now being purchased for use on the routes of United Air Lines. Rated at 550 h.p. at 8,000 ft., the S1H1-G is the latest model "Wasp" in production.

From the same source we hear that Lt. Murray B. Dilley, who is flying the Vance "Viking" recently described in *Flight*, will be accompanied by Monty G. Mason, as pilot and navigator. The latest report on this machine gives a cruising speed of 175 m.p.h. at 9,000 ft., and a top speed of about 200 m.p.h. at the same altitude.

An Indian Difficulty

Owing to the retention of the ban on flying across restricted areas in the North-West Frontier Province, India, it is now unlikely that competitors in the speed race will be able to make Allahabad from Bagdad in one hop. The course mapped out for the race gave a direct route across Persia and Southern Afghanistan, but regulations regarding restricted areas necessitated a diversion of the route in a more southerly direction, skirting the coast of Persia on the Persian Gulf. This creates a problem of the first magnitude for competitors in the speed race. They cannot carry enough fuel for a non-stop flight from Baghdad to Allahabad. The deviation increases the distance of the race by about 1,200 miles.

It is expected that competitors will land either at Karachi or Jodhpur. At Karachi a strong reception committee has been formed with Sqd. Ldr. Brown as chairman. Two officers and twelve airmen of the Royal Air Force will be on duty. The aerodrome is now completely equipped for night flying, and Jodhpur will shortly be similarly equipped. A control tower is being built at Jodhpur and electrical equipment consisting of a rotating beacon, boundary lights and a floodlight has been ordered. The Maharaja, who is a great flying enthusiast, has expressed his desire to defray all the expenses in connection with the arrangements for the race, and to accommodate all competitors at the aerodrome hotel as guests of the State.

Late News

It may be seen from our table of entries that Capt. Frank Hawks is flying the Beechcraft A.17.F. nominated by Mrs. Louise Thaden. One hears that he will be accompanied by Major Herbert Thaden. Mr. H. W. G. Penny, the nominator and pilot of a Vultee V-1a, will have, as his co-pilot, Lt. Com. G. R. Pond, who lately flew the Atlantic in a Bellanca, in company with Lt. Sabelli.

It is now definite that Flt. Lt. E. H. Fielden will fly in "Comet" No. 19 in place of the nominator, Mr. Bernard Rubin, who is a sick man.

At Mildenhall Aerodrome, the starting point, a special post office will be provided. For eight days before the race the Royal Aero Club will make the aerodrome its "race headquarters."

An excellent schedule of the Darwin-Charleville-Melbourne route has been produced by Shell.

For Philatelists

Stamp collectors who wish to send letters to Australia and have no one there to return them may address their letters to K.L.M., Hofweg 9, The Hague, Holland, where these letters should arrive on, or before, October 18. On the envelope should be written "London-Australia Air Race." The envelope must contain an international postal coupon to the value of 1.25 Dutch guilders, and a second envelope must be enclosed, addressed to the K.L.M. Representative, St. George Street 225, Sydney, Australia. K.L.M. will put special air mail stamps on this second envelope, which will be stamped with an extra postal indication regarding the race. In Australia the cover will be marked with the date of arrival. The K.L.M. representative will open this second envelope, which must contain a third one bearing the address to which the second cover must be returned. The second and third cover together are to weigh less than 10 grammes, as they will have to be stamped in Holland, after which their weight must not exceed this figure.

Entertaining the Crews

The Royal Aero Club announces the following donations to the hospitality fund for the entertainment of the crews of foreign aircraft while in this country: Lieut. Col. W. A. Bristow, £10 10s.; Captain Arata Oka, £2 2s.; S. J. Gillchrist, £5; F. H. Matusch, £2 2s.; Sir John Higgins, £2 2s.; S. C. Tucker, £1; E. F. Stephen, 10s.; Dr. A. H. Douthwaite, £2 2s.; Nigel Tangye, £1 1s.; Charles Sutro, £2 2s.; Rex Uden, £2 2s.; F. R. Walter, £2 2s.; R. Blackburn, £3 3s.; C. B. Bond, £2 2s.; Major Gilbert Dennison, £2 2s.; J. R. Micklethwait, £5; F. M. Luck, £1 1s.; A. J. Richardson, £1 1s.; Air Commodore J. G. Weir, £5 5s.; Flt. Lt. G. Shaw, £10; E. T. Sturdy, £2 2s.; Stewart Scott Hall, £2 2s.; Tecalemit, Ltd., £10 10s.; R. M. B. Micholls, £5 5s.; R. L. Preston, £1 1s.; Sqd. Ldr. J. L. N. Bennett-Baggs, £1 1s.; Dunlop Rubber Co., £5; Whitney Straight, £5 5s.; Dipl. Ing. Kurt H. Weil, £1; G. H. Wilson-Fox, £2 2s.; Short Brothers, Ltd., £2?, A. J. A. Wallace Barr, £5 5s.; Alan Goodfellow, £2 2s.; J. H. Strang, £1; Sydney Norris, £1 1s.; Albert E. Bolton, 5s.; J. A. H. Parker, £2 2s.; Mr. and Mrs. O. F. H. Atkey, £3; Lord Nuffield, £26 5s.; W. C. Devereux, £5 5s.; Lt. Col. Sir Francis McClean, £3 3s.; Aircraft Exchange and Mart, £2 2s.; Proprietors of *Flight*, £5 5s.

No. 35: The Fairey "Fox" to be flown by R. Parer and G. E. Hemsworth.

THE ROYAL AIR FORCE

Service Notes and News — *Air Ministry Announcements*

No. 203 (F.B.) SQUADRON

The three "Rangoons" of No. 203 (F.B.) Squadron flew from Singapore to Batavia, over 500 miles, on September 20. On the 24th they reached Koepang.

No. 209 (F.B.) SQUADRON

The two "Perth" flying boats which had to abandon their cruise to Greenland have returned to Mount Batten.

NEW AERODROMES

The plastering of East Anglia and the Fen Country with Service aerodromes continues. Two more sites have been selected by the Air Ministry, one at Feltwell, about thirteen miles from Ely, and one at Marham, eight miles south-east of King's Lynn, in Norfolk. Still more will have to be found before all the new squadrons in the five years' programme are raised.

SIR PHILIP SASSOON

Sir Philip Sassoon, Under-Secretary of State for Air, left England on Saturday, September 22, on an extended tour of R.A.F. Units in overseas commands.

He embarked at Calshot on the morning of the 22nd on the new flying boat Singapore III, and flew by way of Hourtin, Etang de Berre and Ajaccio to Malta. From Malta he will proceed via Athens and Crete to Aboukir, and after visiting the various R.A.F. stations in the Middle East, will proceed by aeroplane to Iraq. Thereafter he will continue through India to Malaya, and, following a short stay at Singapore, will return on October 14 to India. After visiting the R.A.F. stations on the frontier and elsewhere he will leave Karachi on October 24, arriving back in England on October 29 in time for the opening of Parliament.

ARMY MANŒUVRES IN THE WEST

Aircraft were used with much energy on both sides during the sham war waged round Hungerford and Marlborough on September 19-21. Capt. Liddell Hart wrote in the *Daily Telegraph* on the second day: "The great final exercise of the Army looks rather as if it may become predominantly an indirect lesson in the power of the Air Force." During the manœuvres the director, Gen. Sir John Burnett-Stuart, and also the chief umpire made a number of journeys in "Rotas" (i.e., R.A.F. autogiros). In these days of mechanised forces the "Rota" must be a tremendous boon to the higher command.

R.A.F. GOLF CHAMPION

Sq. Ldr. C. H. Hayward won the R.A.F. golf championship on September 23 at Sandwich, beating F/O. Robins in the final after playing 41 holes.

INTER-SERVICES CROSS-COUNTRY CHALLENGE CUP

His Majesty the King has been graciously pleased to present a challenge cup to be competed for annually in the Inter-Services Cross-Country Championships. The cup was first competed for at the Inter-Services Cross-Country Championship Meeting at Bordon on April 19, 1934, when it was won by the Royal Air Force. The cup will be kept in the officers' mess at Uxbridge during the period it is held by the Royal Air Force.

R.A.F. RUGBY UNION

Group Captain the Reverend A. McHardy, Headquarters, Inland Area, Bentley Priory, has been appointed referees' representative on the committee of the R.A.F. Rugby Union *vice* Flight Lieutenant J. I. T. Jones.

SPECIALIST COURSES AT CAMBRIDGE

The undermentioned officers, having successfully completed the specialist course in engineering or signals at Cambridge University and obtained the degrees indicated, are awarded the appropriate symbols:—

Awarded symbol "E."*

Flight Lieutenant E. B. Steedman—3rd class, Mechanical Sciences Tripos.

Awarded symbol "S."*

Flight Lieutenant P. Kinsey—B.A. (ordinary).

AIRMEN PILOTS

The following addition has been made to the Air Ministry Order which regulates the re-engagement of airmen pilots:—Airmen pilots who are classified medically as temporarily unfit for flying duties and have been remustered to their basic trades will be regarded for re-engagement purposes as pilots. In such cases selections for re-engagement will be provisional and will not be finally approved before remustering as pilot takes place; airmen who do not regain their fitness for flying duties will be considered as members of their basic trades and, if they are due to apply for re-engagement during the eighth year of service and the appropriate date has passed, should forward applications immediately on being found permanently unfit for piloting.

THE R.A.F. BENEVOLENT FUND

The usual meeting of the Grants committee of the fund was held at Iddesleigh House on Thursday, September 20. Mr. W. S. Field was in the chair, and the other members of the committee present were: Air Commodore B. C. H. Drew, C.M.G., C.B.E., and Wing Commander H. P. Lale, D.S.O., A.F.C. The committee considered in all a number of cases, and made grants to the amount of £378 18s.

The next meeting was fixed for Tuesday, October 2, at 2.30 p.m.

ROYAL AIR FORCE GAZETTE

London Gazette, Sept. 18, 1934

General Duties Branch

Air Commodore R. H. Verney, O.B.E., is appointed Director of Technical Development, Air Ministry, vice Air Commodore H. M. Cave-Browne-Cave, D.S.O., D.F.C. (Sept. 17); Flt. Lt. R. G. Forbes is granted a permanent commission in this rank (Sept. 19).

The follg. Flying Officers are granted permanent commissions in this rank:—H. G. Adams (Sept. 13); L. E. Jarman, B. Paddon, A. C. Watson (Sept. 19).

P/O. M. Hastings is promoted to the rank of Flying Officer (July 10); Flt. Lt. F. T. Eades, D.F.C., is placed on the retired list (Sept. 16); F/O. R. R. Bennett is placed on the retired list at his own request (Sept. 15); Flt. Lt. F. H. Astle is placed on the retired list on account of ill-health (Sept. 18).

The follg. Flying Officers are transferred to the Reserve (Sept. 13):—CLASS A.—S. H. Bell, D. P. A. Boitel-Gill, G. B. S. Coleman, C. R. Davies, J. L. M. Davys, S. W. H. Egan, C. J. Hansford, E. E. Noddings, R. C. Parker, I. N. Roome, K. N. Sayers, S. D. Slocum, H. J. Wilson. CLASS C.—L. R. Mouatt.

Medical Branch

The follg. are granted short service commissions as Flying Officers for three years on the active list with effect from Sept. 3 and with seny. of the dates stated:—J. C. Blair, M.B., Ch.B., H. F. Harvey, M.B., B.S., G. H. Morley, M.R.C.S., L.R.C.P. (Sept. 3, 1933), A. W. Callaghan, M.B., B.Ch. (April 8).

F/O. W. P. Griffin, M.B., B.Ch., is promoted to the rank of Flight Lieutenant (Sept. 4).

Chaplains Branch

The Rev. D. F. Blackburn is promoted to the relative rank of Group Captain (Aug. 16).

Errata

In the *Gazette* of Sept. 11:—For F/O. Godfrey Cathbar O'Donnell, D.F.C., *read* Flt. Lt. Godfrey Cathbar O'Donnell, D.F.C. For William Frederick Quillam *read* William Frederick Quilliam.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

W. L. Stranger is granted a commission as Pilot Officer on probation in Class AA (i) (Aug. 8); Flying Officer on probation E. J. Dease (Lt., The Rifle Brigade, R.A.R.O.) is confirmed in rank (Jan. 29); Flt. Lt. W. B. E. Powell is transferred from Class A to Class C (Sept. 13); F/O. J. R. Foster relinquishes his commission on completion of service (Aug. 24).

AUXILIARY AIR FORCE

General Duties Branch

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—H. S. Cavendish is granted a commission as Pilot Officer (Aug. 4).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

F/O. I. A. Murray resigns his commission (Aug. 3).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—J. A. G. de Courcy, M.C., to Home Aircraft Depot, Henlow, 3.9.34. For Engineer duties vice Sqd. Ldr. L. J. MacLean, M.C.

Squadron Leaders.—H. S. Broughall, M.C., D.F.C., to No. 17 (F) Squadron, Kenley, 30.8.34. To command vice Sqd. Ldr. F. J. Vincent, D.F.C. S. C. Strafford, D.F.C., to D.O.I., Dept. of C.A.S., Air Ministry, 3.9.34. Vice Sqd. Ldr. G. E. Gibbs, M.C. P. H. Cummings, D.F.C., to Headquarters, Central Area, Abingdon, 11.9.34. For duty as Senior Equipment Staff Officer vice Sqd. Ldr. F. P. Adams. J. M. Mason, D.S.C., D.F.C., to Air Armament School, Eastchurch, 10.9.34. For Administrative duties. C. W. Attwood, to No. 7 (B) Squadron, Worthy Down, 12.9.34. For flying duties vice Sqd. Ldr. J. M. Mason, D.S.C., D.F.C. H. W. Evens, to Headquarters, Inland Area, Stanmore, 14.9.34. For Air Staff (Signals) duties vice Wing Com. J. H. Simpson. L. J. MacLean, M.C., to Reception Depot, West Drayton, 15.9.34. For Engineer duties with Central Trade Test Board vice Sqd. Ldr. S. T. Freeman, M.B.E. T. C. Thomson, to Headquarters, R.A.F. India, Simla, 7.9.34. For Equipment (Engineer) Staff duties vice Wing Com. K. M. St. C. G. Leask, M.C.

Flight Lieutenants.—H. H. Martin, to Air Armament School, Eastchurch, 30.8.34. D. W. F. Bonham Carter, to Communication Flight, Iraq, 24.8.34. W. L. Freebody, to No. 111 (F) Squadron, Northolt, 11.9.34. H. W. Pearson-Rogers, to No. 65 (F) Squadron, Hornchurch, 10.9.34. A. F. Scroggs, to No. 30 (B) Squadron, Mosul, Iraq, 24.8.34. L. P. Moore, to Headquarters, Coastal Area, Lee-on-Solent, 4.9.34. H. A. J. de S. Barrow, to No. 4 Flying Training School, Abu Sueir, Egypt, 8.9.34. G. D. Green, to Station Headquarters, Hal Far, Malta, 8.9.34.

Flying Officers.—W. R. Beaman, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 3.9.34. M. D. C. Biggie, to Station Flight, Andover, 10.9.34. E. D. MacK. Nelson, to No. 821 (F.S.R.) Squadron, Upavon, 6.9.34. G. G. Barrett, to No. 209 (F.B.) Squadron, Mount Batten, 8.9.34. D. Price, to No. 65 (F) Squadron, Hornchurch, 15.9.34.

Pilot Officers.—K. A. Stewart, to No. 802 (F.F.) Squadron, Netheravon, 7.9.34. J. N. Tomes, to No. 4 Flying Training School, Abu Sueir, Egypt, 8.9.34. D. E. Turner, to No. 65 (F) Squadron, Hornchurch, 15.9.34.

Acting Pilot Officers.—The following Acting Pilot Officers are Posted to No. 4 Flying Training School, Abu Sueir, Egypt, on 8.9.34:—W. F. Barton, K. S. Batchelor, R. E. Burns, V. N. Clifton, A. G. Corbin, R. M. Fenwick-Wilson, G. M. Fidler, A. Flowerdew, C. Fothergill, C. R. Hart, M. S. C. Hymans, C. W. K. Nicholls, W. I. Scott, J. Storey.

Stores Branch

Squadron Leader.—C. H. Masters, to No. 23 Group Headquarters, Grantham, 7.9.34. For Stores duties vice Sqd. Ldr. W. A. O. Honey.

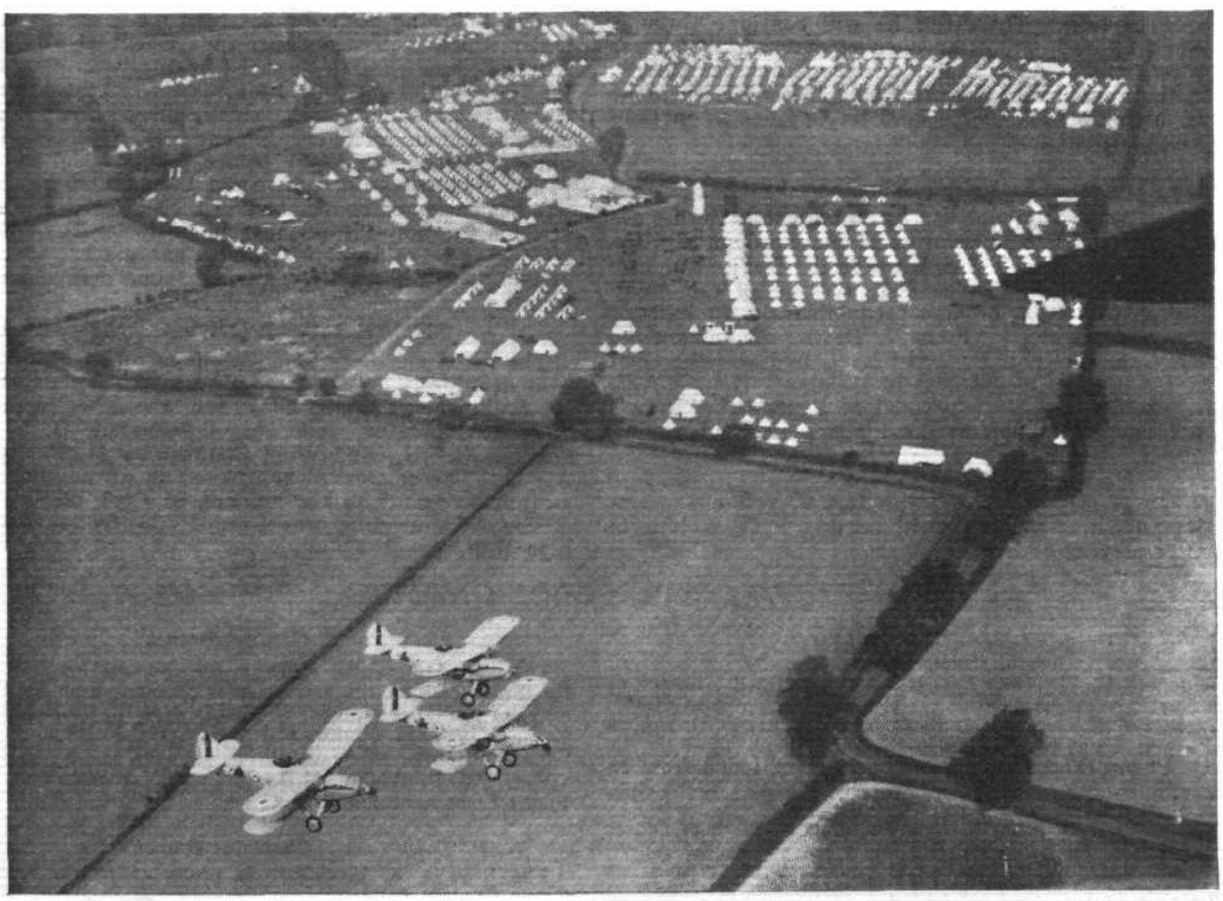
Accountant Branch

Wing Commander.—H. G. Jones, to Headquarters, R.A.F. Iraq, Hinaidi, 6.9.34. For duty as Command Accountant vice Wing. Com. C. P. Ogden, O.B.E.

Medical Branch

Flight Lieutenant (Medical Quartermaster).—F. W. Goodread, to Princess Mary's Royal Air Force Hospital, Halton, 1.9.34.

Flying Officers.—The following Flying Officers are Posted to Medical Training Depot, Halton, on 3.9.34, on appointment to Short Service Commissions:—J. C. Blair, A. W. Callaghan, H. F. Harvey, and G. H. Morley.



RECONNOITRING: A flight of No. 2 (Army Co-operation) Squadron flying over a camp in recent Army manœuvres. The machines are Hawker "Audax" with Rolls-Royce "Kestrel." Working in a flight usually indicates that A.C. machines are on medium reconnaissance. Close reconnaissance is carried out by a single machine.

COMMERCIAL AVIATION

—AIRLINES —— AIRPORTS—

THE DANGERS OF MONOPOLY

Air Transport, Railways, and the Lesson of the Roads

By DONALD H. SMITH, Assoc.Inst.T.

IN this article, which is written by a member of the staff of our sister journal, "Motor Transport," the claim is made that, at the present stage of commercial aviation, any form of monopoly ownership will be bad for aviation as a whole. The history of road transport is briefly reviewed and lessons gleaned which may, or may not, apply with equal force to transport in the air.

While we do not necessarily agree with the writer's opinions, they are interesting enough to deserve attention. One fact overlooked is that, whatever sheer enthusiasm may produce, commercial aviation, in order to be a commercial proposition, must be backed by relatively unlimited resources. The greater the capital the greater, proportionately, will be the returns, and the air services may then be still further improved.

An idealist would rightly claim that the perfectly complete airline company would be entirely international, with lines spanning the whole world. Then, and then only, would aviation have come into its own. That would indeed be a super-monopoly which, in honest hands, might change the whole future of mankind.

IT appears that there may be all the making of trouble for someone in the question of internal air transport and participation therein by the railway companies.

For some time air transport in this country must be of the luxury type of passenger travel, while it is not likely that goods transport will extend beyond that which road hauliers would class as "parcels" or "smalls." Nevertheless, in recognisably limited spheres air transport will become increasingly useable and there should be a profitable return to those who are able to operate it, where traffic exists or where traffic can be created by the institution of a service.

Enthusiasm and the Future

The need of the moment, therefore, is for men with the vision to see the need, to create the facilities where the need will follow, and to go forward in face of difficulties and small profits with the true pioneering spirit. Above all, they must be imbued with the form of enthusiasm that refuses to measure success purely by cash dividends.

No one can predict with any real accuracy the future of internal air transport, just as, thirty years ago, no one could, with certainty, have predicted the present day universality of the motor bus and the lorry in the bulk transport of passengers and goods. Much motor vehicle pioneering was done not so much by those who foresaw what exists to-day, but by those who worked to develop something that they felt to be good in itself.

The same type of men have pioneered air transport. As yet, both the operator and the customer of air transport are pioneers, and the average person engaged on the operating side is usually more interested by the fact that he is flying usefully than that he is producing great financial returns. If, however, he is making a sufficient return to attract the interest of a big undertaking with enormous capital, it must be remembered that capital has no soul with which to be enthusiastic. Reasonably enough, capital requires a return, and the return is an end in itself, whether it be the result of operating aeroplanes or of running steam trains.

The railway companies enjoyed a transport monopoly and then awoke to find that they were being beaten by road haulage. Yet the railway companies were among the earliest operators of road motor vehicles in this country. The plain fact is that in those early days they touched the motor vehicle with a dead hand. Their guiding spirit, bred and nourished in monopoly, blessed (or cursed) by almost boundless financial resources, hedged in by laws—restrictive may be, but protective—was devoid of any enthusiasm or imagination, incapable of any responsiveness to the unconventional, and having no ideals.

Despite close knowledge of transport requirements, the railway fabric was rocked to its foundations by the energy of independent road hauliers. What happened? It was too late to meet the rival on level terms, so every possible string, legal and financial, was pulled. The bus companies, being more consolidated than the haulage operators, were bought, or large interests were secured. Then came the persistent lobbying which resulted in the Traffic Acts of 1930 and 1933, whereby the operations of municipal undertakings and haulage concerns, not to mention those bus companies themselves partly owned by the railways, were cramped.

Meanwhile, many bus and lorry operators were put out of action. Manufacturers of vehicles experienced a notable slowing in the normal expansion of their businesses, and to a great extent progress in design slowed its *tempo*.

It is true that the transport Diesel engine was developed, but mainly because its economic advantages made it almost the despairing hope of the municipalities and the independent operators, staggering under legal and fiscal restrictions. Not one of the railway-influenced bus companies, incidentally, helped in the development of the road Diesel, probably because the technically responsible officials of big undertakings are seldom encouraged to make experiments that may not be successful in the eyes of directors.

Monopoly can be Deadly

In this rapid outline of recent transport history the lesson stands out clearly. The railways can possess a cold and deadly hand.

They have no prescriptive right to a transport monopoly, but their controlling forces assume one. Road transport, however, shook them very badly, although by effective wire-pulling they have now succeeded in slowing down, but not stopping, the normal development of road transport and road vehicle design.

Air transport has not yet disturbed the traffic of the railways to any great extent, nor is it likely to do so for many years. But obviously there is a tendency "to get in on the ground floor" just in case it does. That tendency, however, is not inspired by an enthusiasm for aviation as such, and therein lies the danger.

Most present-day air transport concerns are blessed with unlimited enthusiasm and limited resources, but the many independent operators make for a genuine endeavour and competition among inventors and aircraft makers to pro-

duce better machines. A monopoly ownership of air transport may result in standardised machines as it has resulted in standardised buses. There will be little incentive to produce something new when all orders can be foretold as to quantity and the direction from which they will arrive.

The air operator and the aircraft manufacturer would do well to study the history of road transport since 1929, and also to pay particular attention to the effects on the heavy vehicle industry of the Acts of 1930 and 1933, which bulk far more largely than the sound and sensible provisions included in those statutes "in the interests of public safety." These last were merely the jam surrounding the pill.

CROYDON

Fifteen Years of Business Flying : The First D.H.86 for Qantas : Infant Reactions to Air Travel : A K.L.M. Veteran : Pith Helmets

MR. HARRY TOWN, a Manchester cloth merchant, came into Croydon from Oslo by Scandinavian Air Express last Saturday. He is one of the most regular air travellers and has been using air lines for business ever since the old days of Hounslow and Cricklewood. Mr. Town claims to have flown some 20,000 miles on business and has visited every European city served by air lines. It would be interesting to know how many days, weeks and months he has saved by air travel. He says it is the only means of getting about for a man who wants to keep ahead of competitors.

The first Qantas machine of the "Diana" class arrived at Croydon during last week. Major Brackley, Flying Superintendent of Imperial Airways, Ltd., flew it and is, I am told, most enthusiastic. It will be flown to Australia by Mr. L. J. Brain, with Mr. Price as First Officer. The equipment includes a collapsible boat, and some amusement was caused by the sight of senior officials going through the motions of rowing—across the aerodrome, the surface of which certainly resembles monstrous billows.

One of the largest single consignments of air freight, 1½ tons of G.E.C. wireless parts, was accepted by Imperial Airways, Ltd., last Friday, and was despatched to Paris during the day.

Capt. Stack, that mystery man, left Croydon for Rome almost stealthily early on Friday morning, flying a Miles "Hawk Major" solo. He accomplished the journey in 8 hours. A more leisurely trip was that of twenty members of the Vintage Club who flew by Imperial to Cologne upon business connected with their genial craft. Five British architects and surveyors left by the K.L.M. 7 a.m. service for Holland on the first "leg" of an air tour of Europe, to study housing conditions and modern domestic architecture.

The increase in air travel by groups of people representing one specific trade or profession is very noteworthy. Another example was the special charter of Imperial Airways "City of Coventry," piloted by Capt. E. J. Wilcockson, from Croydon to Liverpool. The party consisted of experts in engineering and electricity, representing home and overseas interests, and the object of the flight was to visit the British Copper Refinery works near Liverpool, the only one of its kind in England. So satisfied were they with the flight that the company has announced that regular use will be made of air transport for similar future visits. During the week The Grand Duchess of Luxembourg arrived by Sabena special charter machine *via* Brussels, with her son, Prince John. The Prince is to go to school in this country.

Olley Air Service, Ltd., recently saved five leading jockeys an all-night train journey by flying them from Ayr to Windsor. An unaccompanied air traveller, aged 6½, arrived almost unnoticed last week, for just previously one aged 6 had also arrived alone. He asked "why all the fuss and press photography" as he had flown six or seven times and had made his first unaccompanied flight, when 4 years old, by Imperial Airways, Ltd. The sight of increasing numbers of very small babies coming through the airport prompted me to ask the Stewardess how these mites travelled. She said they invariably arrived smiling and chuckling and were practically never upset in rough weather. This seems proof almost that man was intended to travel by air; I wonder, by the way, how well, or how badly, infants two or three months old travel by sea.

On Saturday, September 22, Mr. L. Sillevis completed 12½ years service with K.L.M. He has approximately 10,000 hours to his credit and about two million flying kilometres. He joined K.L.M. in March, 1922, and flew the original D. H. Nine open cockpit aeroplanes with which K.L.M. started the London-Amsterdam service. The journey now scheduled to take 2 hr. 15 min.—and frequently done in less—was then seldom flown under 3 hr. 45 min. Passengers were dressed up in lifebelts and pilots depended more on instinct than on the few erratic instruments then in use.

Imperial's lost property office at Airways Terminus contains the usual assortment of walking sticks, umbrellas, tennis racquets, raincoats and oddments, but there is also a mountain of pith helmets. People returning from the East by sea cast their helmets into the waters as an act symbolic of liberty, but you must not throw things out of aeroplanes. One sportsman placed his pith helmet on the floor in Customs at Croydon and danced on it, but, for the most part, air travellers from the East just leave them lying about.

A. VIATOR.

Another Boeing for D.L.H.

A 247-D Boeing, which, with two geared "Wasps," has a rather higher performance than the original version, is being delivered to Deutsche Luft Hansa. Two Boeings are now in regular service between Berlin and Amsterdam.

Incidentally, Sabena has just ordered two Douglas D.C.2's. America certainly seems to be coming to Europe.

Trans-Canada Air Mail Route

It is reported that plans have been submitted to the Dominion Government for a trans-Canada air mail route, to be ready for operation late in 1935. The schedule would provide for a westbound aeroplane, leaving Montreal at 8 p.m. and reaching Winnipeg in seven hours. The Pacific coast would be reached at Vancouver by noon on the following day, the total flying time being sixteen hours. This service, if approved by the Government of Canada, will be the fruition of work which has been in progress during the past two years in connection with the Government's unemployment relief projects. Nearly 10,000 men have been steadily employed at a cost of approximately $2,400,000. The landing fields have yet to be equipped with boundary lights, beacons and searchlights. The plant provides for machines with a cruising speed of about 170 miles per hour, and a maximum speed of 200 miles per hour, and mail from Toronto would link up with the airway route by a connection at North Bay or Sudbury.

Egyptian Air Lines

Passengers carried on the air routes operated by Misr Airwork during the two weeks ending September 2 and September 9 were 157 and 189 respectively. On September 9 a "Dragon," piloted by Capt. Spooner, with a "Fox Moth" as escort, brought H.R.H. the Duke of Gloucester from Port Said to Almaza. The following afternoon His Royal Highness, again piloted by Capt. Spooner and with the "Fox Moth" escort, flew to Suez, where he rejoined H.M.S. *Sussex* bound for Australia.

The Catapult Air Service

The German Luft Hansa has now made its twenty-fifth scheduled flight in the regular postal service across the Atlantic Ocean. Since putting into service the motor boat *Schwabenland*, the Trans-Oceanic service has at its disposal, for the Atlantic hop of 1,900 miles, two aircraft catapult boats, the *Schwabenland* on the African coast and the *Westfalen* on the American coast.

The outstanding feature of the service is its remarkable regularity. The scheduled times have never been exceeded, and on each trip about 20,000 letters are carried.

HESTON

Birkett's Again : Leeds-London-Leeds : Aircraft for Spot Cash : The "Envoy" Appears

AIRCRAFT movements at Heston are still above the fifty an hour mark, and the Traffic Office telephone never ceases to ring with enquiries for times, machines, weather reports and even maps.

Birkett's did a fast piece of work last week for a City man who rang up for a machine at 7 p.m. When he arrived at Heston the Birkett machine was waiting for him, while the Traffic Office had arranged for flares at Liverpool, and had handed the pilot his weather reports. He was in Liverpool at 9.15 p.m. The arrival of Princess Marina, too, in Scotland has kept them busy on Press work.

The 140 m.p.h. Leeds, Heston and Paris service which London, Scottish and Provincial are running is kept busy. It is being used more and more by business men, who leave Leeds at 10 a.m., are in the city by noon, and leave Heston again to be back home at 6.20 in good time for dinner.

The case of the South African miner who was found wandering about Brian Lewis's hangar, and who bought an aeroplane with five hundred £1 notes straight out of his trouser pocket was paralleled recently by a casual visitor who bought a "Puss Moth" for cash after doing two spot landings of incredible neatness. It was eight years since he had handled a machine, but the name at the bottom of his cheque was not unknown once at Gosport.

The arrival of an Airspeed "Envoy" created a great deal of interest, and confounded the experts on the tarmac who were watching its take-off, stop-watch in hand.

Mr. Roderick Denman, technical director of Airwork, Ltd., leaves for America again on September 22 for a further tour of inspection and study of aeronautical radio.

Rochester's Aerodrome

A municipal aerodrome, which lies two miles south of Rochester itself, is now open to public use. Two radio masts, 100 feet high and 350 yards from the N.W. corner of the aerodrome, constitute the only serious boundary obstructions, and these are illuminated for a period of three hours after sunset.

The Post Office Moves

It appears that there may be some startling alterations to the inland air mail arrangements next year. Negotiations are, it is understood, proceeding between the Post Office and R.A.S. with the idea of speeding up delivery and of linking up the services more satisfactorily. It may be taken, in fact, that the P.M.G. proposes to mould the air services to suit his own purposes.

Plans are in hand for alterations to the roof of the G.P.O. at Mount Pleasant in order to provide an area of 15,000 sq. feet—presumably so that the Autogiro idea may be developed, though it is possible that, instead, a tunnel may be constructed between Croydon and Mount Pleasant. Certainly up-draughts, down-draughts, and the use of a single engine make even an Autogiro a dangerous weapon for housetop operations. "The mails must go through"—but not at the risk of a traffic hold-up or even of a massacre of foot passengers in the streets near Mount Pleasant.

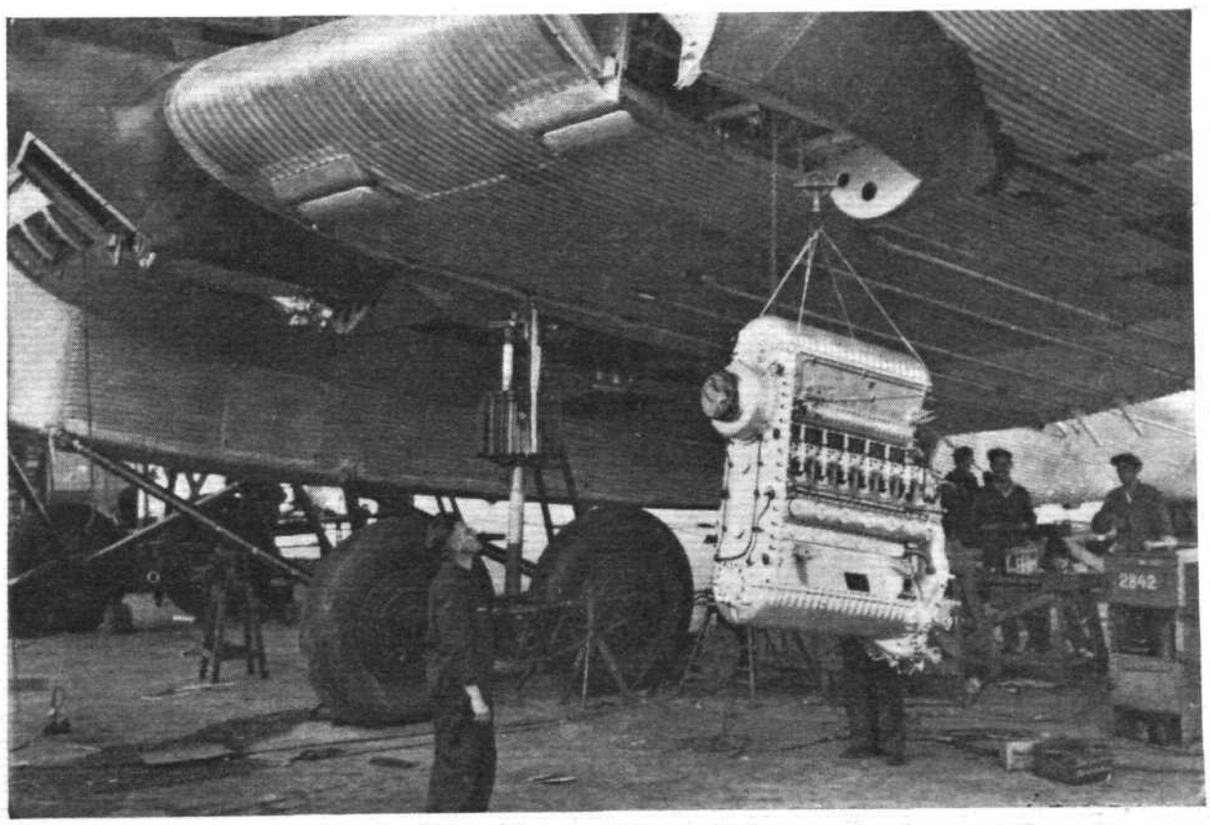
The Isle of Man Ferry

Judging from the traffic obtained since Blackpool and the West Coast Air Services, Ltd., started operations, the public in Lancashire is now really using the air. Admittedly the Isle of Man line is, for the most part, a "holiday" service, but people do not travel by air only for the sake of the experience, and, once urged into the new medium, they very rarely forsake it.

Between May, 1933, and the end of the summer season 1,900 passengers were carried on the regular service and 200 passengers in specially chartered machines. This year the figures are still better. More than 3,200 passengers have been carried in all, apart from joy-flying and the transport of newspapers. Only on four occasions, due to fog, have the services been abandoned.

The summer programme ended on September 17 and on the following day the winter operation began—once a day each way.

When aviation ceases to be seasonal it can be considered to have its feet on "solid ground."



REPLACEMENT: Hoisting one of the "Jumo 4" Diesel engines into the Junkers G.38 *Von Hindenberg*. This is, incidentally, one of the two types being manufactured under licence by D. Napier and Son, Ltd., and it will be known here as the "Culverin."

THE INDUSTRY

BRIAN LEWIS PROGRESS

A DEFINITE measure of the state of any industry, particularly of those industries which deal in commodities for public use, can be obtained through the volume of trade done by the agents, who dispose of that commodity either new or second-hand, to the consumer. Aviation is, of course, still a comparatively young industry, and the number of aircraft bought, either by private owners or by transport operators, is still comparatively small. The sales to these parties do, however, show a definite and steady rise, as examination of the trade done by a firm like Brian Lewis and Co., Ltd., shows. For example, the average number of aircraft sales per month by this firm this year is in excess of those for the corresponding months of the two previous years, and this applies not only to new machines, but to second-hand machines as well. Brian Lewis and Co. are, of course, managing distributors for the De Havilland Aircraft Co., Ltd., throughout the British Isles, and it is only natural to assume that their trade would be fairly large in view of the genuinely commercial machines which have emanated from the De Havilland factory recently. The numbers of privately owned aircraft at the end of 1933 did not exceed those of 1932 by as much as those of 1932 exceeded the number at the end of 1931, but so far this year the number of new machines sold is considerably in excess of the number of second-hand machines sold, and this would seem to indicate a steady revival in private ownership. Brian Lewis have made great progress of late, and apart from their large depot at Heston, where Mr. Dudley Page, their sales manager, is in charge, they now have Mr. W. Gairdner in charge at Hooton Park, and Mr. F. A. McNeill at Renfrew. Every member of their administrative staff is an active aviator, including Mr. Gordon Selfridge, their Chairman, a fact which can leave no doubt in the minds of the buying public that the firm is really competent to handle this kind of business. They are, of course, as closely in touch with the commercial operations as they are with clubs and private owners, and among the firms to whom they have supplied aircraft during the past year are: Jersey Airways, Ltd., Olley Air Service, Wrightson and Pearce, Ltd., Northern Airways, Ltd., Highland Airways, Ltd., The Portsmouth, Southsea and Isle of Wight Aviation Co., Ltd., and the Scottish Motor Traction Co., Ltd.

PRODUCTION MANAGER FOR GENERAL AIRCRAFT

A General Aircraft, Ltd., announcement states that Mr. G. S. Gibbons has been appointed Production Manager to that firm. Mr. Gibbons has had experience with both Vickers Aircraft, Ltd., and Handley Page, Ltd. It is proposed that after the works have been moved to Hanworth large commercial machines will be produced.

First-Aid in Gas Cases

The British Red Cross has issued a manual, published by Cassell and Co. at 6d., on first-aid treatment of cases of gas poisoning. It is stated that it is the policy of the International Red Cross to do all in its power to prevent chemical warfare, but, in case the prohibition should be violated, these instructions are issued in peace time with the object of protecting the civil population.

Royal Aeronautical Society Lectures

The following lectures have been arranged for the first half of the 1934-5 Session. Air Marshal I. Balbo has agreed to lecture on his Atlantic Flight on a date which will be announced as soon as possible. All lectures will be held in the Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m.

October 18.—*The Education of Aeronautical Engineers.* Prof. A. J. Sutton Pippard, F.R.Ae.S

October 25.—*The Compressed Air Tunnel.* Mr. E. F. Relf. F.R.Ae.S.

November 8.—*Speeds of Commercial Aircraft.* Monsieur Louis Breguet.

November 15.—*Flying Boats.* Mr. I. I. Sikorsky.

November 22.—*Air Turbulence near the Ground.* Prof. Dr. Wilhelm Schmidt.

November 29.—*Engine Research.* Capt. A. G. Forsyth.

December 6.—*Recent Progress of the Autogiro.* Señor Juan de la Cierva, F.R.Ae.S.

December 13.—*Recent Research in Metallurgy.* Dr. W. H. Hatfield, A.F.R.Ae.S.

LIKE THE MOTHER COUNTRY: A typical New Zealand homestead, on the outskirts of Masterton. Even contours provide ideal flying country in this particular locality.

NEW COMPANIES

HULL AERO CLUB (1934), LIMITED, Friary Chambers, Whitefriargate, Hull. Nominal capital of £2,000 in £1 shares. The objects are to enable members to learn and practise the art of flying; to promote and encourage aviation, to establish and maintain a club, etc. The Corporation of Hull are vendors of property proposed to be acquired by the co. Purchase consideration £500 in cash. The first directors are: Sir Philip B. Reckitt, Bt., Little Green, Compton, Chichester, Sussex. Sir Arthur J. Atkinson, Kt. Elloughton Dale, Brough, E. Yorks. Basil K. Barton, 6, Parliament Street, Hull, solicitor. Arnold R. Cleminson, Quarryside, North Ferriby. James, B. Upton, Rowlston Hall, Hornsea, E. Yorks. Alan Thelwall, Beech Hill, Swanland, North Ferriby. George E. S. Lamb, 11, Plantation Drive, Hull. Thomas E. Richardson, 53, Boulevard, Hull. Solicitor: Cyril Dawson, 19, Parliament Street, Hull.

AIRSIGNS, LTD. Capital £1,200 in 1,000 ordinary shares of £1 each and 4,000 deferred shares of 1/- each. Objects: to carry on the business of advertising and publicity contractors and agents, sign writers, manufacturers and exhibitors particularly by means of signs for use on aircraft, kites, etc. The directors are: Wm. E. Westfield-Stap, "Clovelly," Cosdach Avenue, Wallington, Surrey. Ernest N. Westfield, 17, Charlotte Road, Wallington. Edward L. Hayes, 94, Gloucester Place, W.1.

CHANGE OF NAME

AIRCRAFT SALES, LTD., 53A, Shaftesbury Avenue, W.1. Name changed to Aircraft Distributors, Ltd., on September 6, 1934, by sanction of the Registrar.

PUBLICATIONS RECEIVED

Earl Haig's British Legion Appeal Fund. Poppy Day Report 1933. Issued by British Legion Appeals Department, 26, Eccleston Square, S.W.1.

Weights and Gauges of Tubes, Sheets and Strips, Wire and Rods. Charles Clifford & Sons, Ltd., Birmingham.

Aeronautical Research Committee Reports and Memoranda. No. 1583. Fluid Flow in Rough Pipes. By A. Fage. October 1933. Price 1/- net. No. 1588. An Experimental Study of the Stalling of Wings. Aeronautics Laboratory, Cambridge. December 1933. Price 1s. 3d. net. No. 1593. Effect of Wind on the Take-off of Seaplanes. By E. T. Jones. January, 1934. Price 1/- net. London: H.M. Stationery Office, W.C.2

Aeronautical Research Committee Reports and Memoranda. No. 1590. An Experimental Investigation of the Wake Behind and Elliptic Cylinder. By G. J. Richards. June, 1933. Price 9d. net. No. 1591. Full Scale Water Resistance of a IIIF Seaplane in Steady and Accelerated Motion. By E. T. Jones. December, 1933. Price 1s. 9d. net. No. 1594. Landing and Take-off Speeds of Aeroplane. By R. S. Capon. January, 1934. Price 6d net London: H.M. Stationery Office, W.C.2.

Lloyd's Register of Shipping. Report of the Society's Operations during the Year 1933-34. London: 71, Fenchurch Street, E.C.3.

L'Aviazione Civile attraverso il Mondo. Informazioni E Notizie. N.4. 1934-(XII). Rome: Ministero Dell' Aeronautica Laboratorio Fotomeccanico

The Journal of the Royal Air Force College, Cranwell. Vol. XIV. No. 2. Autumn, 1934. Printed by Gale & Polden, Ltd., London.

CATALOGUE

Aviation and Meteorological Instruments. Short & Mason, London.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1933

Published September 27th, 1934.

6465. C. LORENZ AKT.-GES. Aeroplane landing system employing radiated beams of electromagnetic energy. (415,784.)

32943. C. DORNIER. Aircraft provided with rotatable wings or blades. (415,917.)

4626. DORNIER-METALLBAUTEN GES. AND C. DORNIER. Seaplanes. (415,736.)